Michigan Coin Machine Operators Association

Smoking Ban Position

MCMOA is opposed to legislation enacting a total statewide ban on smoking. Included in this packet are several studies completed in areas where smoking bans have been enacted, and the resulting economic impact to bars, restaurants and clubs in those areas.

MCMOA urges the legislature to exclude class C liquor establishments from this ban, or to allow establishments to opt out of the ban.

If any of the committee members would like further information, please contact Mandy Tomich at our central office, 517-377-0848 and she will be happy to answer any questions you may have.

Thank you for your consideration.

Michigan Coin Machine Operators Association

Testimony Regarding Smoking Ban in Michigan
Submitted by President Richard Massa

The MCMOA is opposed to the statewide smoking ban being proposed by legislators. The following bullet points outline the issues that would arise from the passage of a complete smoking ban in Michigan:

- The MCMOA is an association comprised of various owners of coin-operated machines, including video games, pool tables, dart boards, and cigarette vending machines.

- The MCMOA owns many coin-operated machines in bars, restaurants, and fraternal organizations (VFW, American Legion, Knights of Columbus, Eagles, etc.) throughout the state.

- The short term economic impact of the passage of this legislation would be devastating to several community bars; this creates a ripple effect, as many coin operated machines are housed in such establishments. Therefore, the close of bars due to a ban on smoking will devastate the coin-op industry as well.

- While some reports show overall business in bars and restaurants to increase after the ban is in effect for several years, in the short term, business has been noted, in states already imposing a ban, to decrease dramatically. This is not the economy to test this sort of ban in. There are enough Michigan residents without jobs without adding restaurant workers and bar owners to the list.

- It is not illegal to purchase a pack of cigarettes; it should not be illegal to smoke them in public areas.

- The MCMOA would fully support a workplace smoking ban that excludes Class C liquor license establishments.

Ohio Coin Machine Association

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March 26, 2009

Michigan Coin Machine Operators Association
Ms. Mandy Tomich, Executive Director
124 W. Allegan, Suite 800
Lansing, MI 48933

Re: Ohio Smoking Ban

Dear Ms. Tomich:

This letter is in response to your inquiry regarding the economic impact of the statewide smoking ban imposed on the State of Ohio by ballot referendum in 2006. Since the enactment of the smoking ban, small businesses witnessed an average decrease of 30% in overall sales. More specifically, bars and taverns noticed a 20% - 40% decrease in alcoholic beverages sold since the smoking ban was implemented.

The State of Ohio has records indicating that liquor sales have increased since 2006, and while that may be the case; the State does not differentiate between on premise and off premise sales. Since sales at bars are down, we realize that liquor consumption is now taking place in private residences where individuals are allowed to smoke, rather than bars or restaurants.

The decrease in sales at bars has negatively impacted the coin machine industry as well. Sales related to coin operated machines are down 30% across the board and we have been forced to lay off over 250 people.

I hope you find this information useful to your association as you educate your legislators on the negative impact a total smoking ban has on small family-owned businesses (and, in turn, tax collections). We hope the Michigan legislature learns from another one of our neighbors, the Pennsylvania General Assembly, as they have already amended their ban to allow smoking in bars because of the disastrous effect it had on Pennsylvania businesses.

Sincerely,

David P. Corey
Executive Vice President

Emmitsburg.net

Non-Profit Internet Source for News, Events, History, & Culture of Northern Frederick & Carroll County Md./Southern Adams County Pa.

Emmitsburg Area Historical Society

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Smoking ban affecting local businesses

Elizabeth M. Piazza
Emmitsburg Dispatch

(3/6) Most afternoons, a group of women would enjoy lunch at the Ott House in Emmitsburg. They would sit, play Keno and chain smoke, recalls Robert Ott, co-owner of the Ott House. "Once the smoking ban went into effect, we haven't seen them since."

Restaurants and bars are noticing a decline in business since the Maryland Clean Indoor Act took effect Feb. 1. The smoking ban, as it is often referred, bans smoking in all public places, including restaurants and bars.

Business owners in the town of Emmitsburg notice an even greater decline. Only one mile separates them from Pennsylvania, where there is no smoking ban.

Larry Shriner, owner of One More Tavern in Emmitsburg recognized a negative impact. A small establishment, One More Tavern serves breakfast, lunch and dinner and 95 percent of its patrons are smokers. "People are coming in, they just aren't staying as long," said Shriner. "They are not buying a third and fourth round."

One More Tavern, known for having the lowest priced beer in town, is looking to raise prices just to meet the bottom line. He has lost customers to Dave and Jane's Crabhouse and the Four Seasons in Fairfield, Pa.

"We have shut bands down early since they are playing only to the employees, it's been so slow at night," said Susan Glass, co-owner of The Ott House. She does admit that it is a bit early to determine if the decrease in business is due to the smoking ban or the economic slump, although she believes it to be a combination.

The effect does not seem to be as great in Thurmont. Vickie Grinder, general manager of The Cozy Restaurant, doesn't see a difference after the ban.

"January and February are difficult months in the hospitality industry as is. As far as the smoking ban, I do not feel it has affected our business," Grinder said.

The Cozy Restaurant is unique in that during the warmer months, patrons can sit outside on the arboretum to eat, drink and smoke. Grinder expects that it will be business as usual when the arboretum opens.

Skipper Misner, owner of the Thurmont Bar and Grill thinks business has stayed about the same. "We've naturally had complaints from patrons, but in a few months, they will get used to it. I have heard the ban has hurt others."

Owners are all in agreement that other issues have arisen as a result of the smoking ban. Crowds of smoking patrons tend to gather around the entrances which can be intimidating to newcomers. They worry that non-smokers will not want to walk through the crowd of smokers to enter an establishment.

Littering has increased. Even with proper receptacles in place, many smokers

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The economic incidence of smoking laws

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Although laws restricting smoking in restaurants are becoming commonplace, most research has focused on either the health benefits that laws may provide customers and workers or whether laws harm owners. But while smoking laws may directly alter profits, owners may alter prices, output, and other business attributes in ways that affect the welfare of customers and workers. This study examines whether restaurant and bar owners alter prices, entertainment, hours of operation and other business attributes in response to local smoking laws. Substantial support is found for these attribute changes in the Wisconsin hospitality industry. One implication is that an overall assessment of the desirability of smoking laws should consider economic effects imposed on owners, customers and workers, as well as health benefits that follow laws.

I. INTRODUCTION

Laws that ban or restrict smoking in restaurants are becoming more prevalent. Public health groups advocate such laws on the basis of controlling second-hand smoke and/or possible health benefits to non-smoking customers and workers. However, in order to examine the overall impact of smoking restrictions, the economic effects of these policies should also be examined. These laws may directly alter profits and changes in business environments may lead owners to alter prices, output, and other business attributes in ways that affect the welfare of all customers and workers.

An overall assessment of the desirability of smoking laws then should consider all of these effects. While a few studies examine the effects of smoking laws on restaurant owners, there is little research that examines the economic effects imposed on customers and workers. This paper examines the economic effects imposed on owners, customers and workers in roughly 1,000 restaurants and bars in Wisconsin. Wisconsin provides a good case study because its adult smoking rate is 23.7%, which is similar to the median smoking rate of 22.8% for all states.[1] The data set contains detailed information at the individual business level and provides data on establishments that have been subjected to local smoking laws as well as those that currently operate without them. The analysis therefore examines whether there are significant differences between the actual and predicted effects of laws. This comparison is important for assessing predictions made concerning the extension of laws onto other localities.

The paper begins with a survey of the literature on the economic effects of smoking laws on restaurants and bars. Next, a series of hypotheses on the relationship between smoking laws and owners, customers and employees are developed, followed by the presentation of data and an empirical model. An overall assessment of the evidence concludes the paper.

II. PREVIOUS LITERATURE

Most of the literature in this area addresses whether or not smoking bans lower the revenues (as a proxy for profits) of restaurants and bars. This literature follows one of two directions. One direction focuses on impacts on individual

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[1] 1999 data obtained from the Centers for Disease Control and Prevention. Wisconsin ranks 35th out of 50 states when listed from lowest to highest adult smoking rates.

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owners. Dunham and Marlow (2000b) examined the distribution of expected effects of smoking laws on revenues using data from a nationwide survey of 1,300 restaurants and bars. For restaurants, 6% of owners predicted that bans raise revenues, 39% predicted lower revenues, and 55% predicted no changes. For bars and taverns, a ban was predicted to raise revenues by 2% of owners, lower revenues by 83%, and produce no change by 13%. Predictions of gains, losses and no effects on revenues are found to be consistent with how owners allocate seating within their establishments. That is, the lower was seating allocated to non-smoking use, the higher the probability that an owner predicted that a smoking ban lowered revenues. This result indicates that seating allocations are made on the basis of profits, as is consistent with an efficient private accommodation market.

The other research direction aggregates all establishments into one 'community-wide' impact. A number of studies have concluded that businesses do not suffer reduced sales as a result of bans. Glantz and Smith (1994) compare 15 cities with smoking laws with 15 matched control group cities. They conclude: '[L]egislators and government officials can enact such health and safety requirements to protect patrons and employees in restaurants from the toxins in second-hand tobacco smoke without the fear of adverse economic consequences.' In their study of smoking laws in North Carolina, Goldstein and Sobel (1998) conclude: 'Even in the number one tobacco-producing state in the U.S., ETS regulations present no adverse economic impact, and there is no need for exceptions to the ordinances based on such fears.' Sciacca and Ratliff (1998) conclude in their study of Arizona firms that: 'This study seems to indicate that prohibiting smoking in all Flagstaff restaurants has had no effect on total restaurant sales.'

Dunham and Winegarden (1999) examined data from the 1996 survey of restaurant owners discussed above in Dunham and Marlow (2000b) and found that customers patronize hospitality establishments in order to placate three distinct needs: the desire for food, the desire for social companionship and the desire to seek status. Smoking bans appear to positively impact restaurants that supply the first need, while harming those that supply the other two. The authors conclude that the actual impact of the smoking ban on a particular restaurant depends on how that establishment meets the three needs.

The literature review indicates three important research issues that will extend the overall understanding of the welfare effects of smoking laws. First, most studies have only considered the welfare of owners, either individually or collectively, thus missing possible effects imposed on customers and workers. Second, in addition to focusing on the economic effect on businesses, the existing literature tends to examine revenues, or sales taxes, rather than business profits or consumer costs, thus providing an incomplete measure of economic welfare. Third, studies of individual owners have focused on expected rather than actual effects of laws because of limitations of data collection. Biases that complicate the understanding of the economic effects of smoking laws may arise when expected and actual effects of laws differ. As discussed below, the data examined in this study address these three problem areas.

III. THE EFFECTS OF SMOKING LAWS ON BUSINESSES AND CONSUMERS

Governments have justified the imposition of smoking restrictions by claiming that smoking creates negative externalities and harms the health of non-smokers.[2] While the issue of externalities is clearly important for public policy, this paper concentrates on the economic effects that smoking laws may exert on owners, customers and workers in the restaurant and bar industries. Examination of economic effects provides another piece to the overall assessment of the desirability of smoking laws.

In the absence of smoking laws, smoking policies are set by owners who determine air space allocation within their establishments. That is, owners decide in which areas smoking will be allowed, as well as whether to invest in smoking patios, partitions that separate smokers from non-smokers, and air filtration. Coase (1960) provides a general framework that may be applied to how private owners allocate their air space in cases where externalities may be present.[3]

Coase (1960) argued that resources could be allocated efficiently as long as they are privately owned, transferable and transactions costs are trivial. This appears to be the case with air space within private establishments. The space in the restaurant is privately owned and, in effect, owners rent it to customers who value these resources the most. Smokers and non-smokers compete for the scarce resources and owners will allocate space to the demander with the highest bid. The same process is consistent with other allocation decisions of businesses. Department stores allocate space between men's clothing and women's garments, grocery stores allocate space between meats and vegetables, and theatres allocate between comedy and drama. In the case of restaurants, owners determine what smoking policies are consistent with maximum profits by taking into account the competing demands of smoking and non-smoking customers. More air space will be smoke-free as

[2] Gravelle and Zimmerman (1994) argue that passive smoke risk is over-estimated by OSHA.
[3] Boyes and Marlow (1996) provide a discussion of how the Coase Theorem may be applied to smoking within restaurants and bars.

non-smokers out-bid smokers, and *vice versa*. Whether owners cater solely to smokers, to nonsmokers, or accommodate both, depends on customer preferences and the marginal costs of accommodation.[4]

The other condition presented by Coase is that transactions costs be trivial. At first glance, it would appear highly unlikely that smoking and non-smoking customers could separately negotiate over the air space because this might mean that policies change by the hour or day, or that customers must declare how they value the air space. However, owners intermediate between smoking and non-smoking customers thus eliminating the need for costly negotiations. Owners have profit incentives to allocate resources efficiently and air space allocation will be efficient when they cannot change smoking policies and raise profits at the same time.

An important implication of the resource allocation process is that owners will not adopt uniform smoking policies when customers exhibit diverse smoking preferences and owners face diverse marginal costs of accommodation. Marginal accommodation costs are likely to differ between establishments because some buildings may be more easily adapted to physical separations and air filtration systems. Moreover, some owners may face customers who believe that separations or air filtration systems are effective in removing smoke and others may have customers who believe that smoking should be forbidden. The basic point remains that a diverse set of smoking policies exists prior to smoking laws because a one-size-fits-all policy is not efficient when customers display diverse smoking preferences and owners face different marginal costs of accommodation.[5]

Smoking laws shift ownership of the air space from business owners to individuals who prefer that government restrictions or bans take place. However, restaurant owners are now forbidden from 'selling' resources to smokers, even if they could out-bid non-smokers. Air space resources are therefore no longer transferable and profits may fall unless business owners somehow fully shift burdens of the law onto customers or workers. Of course, cases may arise where laws are consistent with pre-law policies, but these events may be uncommon in locations where smoking preferences and marginal accommodation costs vary considerably across businesses.

The discussion thus far suggests the hypothesis that smoking laws exert three possible effects on profits, assuming that owners profit-maximized prior to government restrictions. One, profits fall when laws lower demand and/or raise costs. Two, profits increase when laws raise demand and/or lower costs. Three, profits do not change when laws do not affect demand or costs, or changes in demand are equal and opposite to changes in costs.

Another hypothesis is that bars are more likely to experience profit declines than restaurants. Dunham and Marlow (2000b) report evidence indicating that bars are more than twice as likely to experience revenue drops as restaurants. Unlike patrons in restaurants, bar customers often participate in dining, drinking, listening to music, dancing, and playing pool or darts whereby they roam during visits interacting with other patrons. Bar owners may also find it more costly to separate smokers and nonsmokers because it is too costly to provide separate bands, dance floors, poolrooms, etc., for both smokers and non-smokers.

As discussed above, previous studies do not address whether the economic effects of smoking laws extend well beyond effects on individual owners when burdens are shifted onto their customers and workers. A smoking law may represent a cost for restaurants and bars and, as with any cost, owners have incentives to attempt to shift burdens onto others. Food and drink prices may rise or fall and meal portions, hours of operation, service quality are other attributes that might undergo change. Owners may also shift burdens onto workers through lower compensation or added responsibilities.[6]

It is hypothesized that owners will not follow identical strategies when they attempt to shift burdens onto others. For example, owners with price elastic demands may tend to raise prices less often than owners facing price inelastic demands. Profit changes and the manner and extent to which burdens are shifted onto consumers and workers may be influenced by many factors including: age and size of business, type of business, the percentage of customers who smoke, and the competitive nature and size of local markets.

An important implication of this discussion is that simple observation of sales or profit changes following a smoking law may offer a limited picture of the true welfare effects. Higher profits, for instance, may be consistent with higher prices and lower compensation for workers thus clouding the issue of how desirable a smoking law is for society. Clearly, there are many possible changes when we consider effects imposed on individual owners, customers and workers.

IV. DESCRIPTION AND SUMMARY OF SURVEY DATA

A total of 978 owners of restaurants, bars and taverns in Wisconsin were surveyed by ETC Institute of Olathe,

[4] The importance of accommodating nonsmokers is evident in industry trade magazines. See for example, Walter (1994) and Fruchtman (1992).
[5] See Dunham and Marlow (2000a) and Dunham and Marlow (2003).
[6] Owners may also attempt to shift burdens onto vendors or landlords by lowering payments or rents.

Table 1. *Effects of restrictions on profits (actual and predicted)*

	All restaurants ($n=550$)	Restaurants with govt restrictions or bans ($n=172$)	Restaurants with no restrictions ($n=378$)	All bars ($n=428$)
Decrease	54% (296)	38% (66)	61% (148)	81% (345)
Increase	3% (18)	5% (8)	3% (10)	1% (2)
No change	37% (206)	50% (86)	32% (120)	13% (55)
Don't know	5% (30)	7% (12)	5% (18)	6% (26)

Kansas, during February and March 2001.[7] Of those surveyed, 56% consisted of restaurant owners (550) and 44% consisted of bar and tavern owners (428). This sample represents precision of at least +/− 3.3% at the 95% level of confidence.

Potential for bias is always a concern with survey data.[8] Owners may oppose smoking laws for personal reasons and, as a result, exaggerate profit losses and changes in prices, hours of operation and other business attributes. Those who favour laws may also exaggerate profit gains, falsely report no changes in profits, or in other ways indicate incorrect information regarding other issues. With no information on the likelihood of misinformation, it remains unclear whether personal views would over-ride preferences for maximizing the value of firms.

This study is the first to examine both predictions and actual changes regarding profits and other variables. Owners subject to smoking restrictions and bans reported actual effects, while those who were not subject to laws reported predictions. Thirty-one percent of restaurant owners, and virtually no bar owners, were subject to restrictions or bans, thus providing information on actual effects of smoking laws. Information on predictions and actual changes will be compared to determine if significant differences between these two groups exist.

Even without biased responses related to personal views of owners, it is likely that significant differences will exist between responses by those subject to government laws and those who are not. Dunham and Marlow (2000a) support this prediction when they conclude that smoking laws are passed in states with relatively few smokers and therefore businesses subject to such laws are less likely to experience lower profits simply because they service fewer smokers. This prediction is consistent with the survey data examined here because the average percentage of smoking customers is 28% for restaurants with laws and 40% for those without.[9] In other words, restaurants located in areas that do not have smoking restrictions service 43% more smoking customers than those in locations with them. As the analysis shows, businesses serving relatively few smokers will experience less harm than businesses serving relatively many.

Responses also support the view that the private market provides a diverse array of smoking policies – thus supporting the prediction that profit changes will not be uniform across establishments. For example, 18% of restaurants, but only 0.2% of bars, provide smoke-free facilities, while 34% of restaurants allow smoking throughout, and 97% of bars allow smoking throughout. On average, 44% of seating in restaurants is non-smoking.[10] For restaurants with smoking restrictions, average non-smoking seating use is 56% and, for those without restrictions, average non-smoking seating is 34%.

V. EFFECTS ON OWNERS

Table 1 displays responses in four categories to the question of how profits would change following a smoking ban: all restaurant owners, restaurant owners currently subject to bans or restrictions, owners not subject to bans or restrictions, and all bar owners. Responses for restaurant owners without any bans or restrictions and for bar owners are predictions of impacts, while responses for those subject to bans or restrictions are actual impacts.

Responses are consistent with previous studies that indicate that smoking bans do not impose identical economic effects across establishments. Profit gains are the least common response, as indicated by 5% or fewer owners, thus indicating that bans provide relatively few economic benefits. Lower profits are indicated by 38% of restaurant owners currently subjected to bans, 61% of restaurant owners

[7] The survey was funded by Philip Morris Management Corp., however, this was not disclosed to respondents.
[8] See Berrens *et al.* (1997) and Kerkvliet (1994) for concerns with survey data.
[9] The difference in means is significant at the .01 level.
[10] In restaurants that restrict smoking to certain areas, 34% allowed smoking in bar areas, 31% in separate smoking areas, 29% in non-smoking sections, 16% in outdoor areas, 14% in separate rooms, and 4% in separately ventilated rooms (multiple responses allowed).

Table 2. *Logit estimations of profit reduction*

	All restaurants	Restaurants with restrictions or bans	Restaurants without restrictions or bans
constant	0.60	−0.10	0.80
	2.47	0.20	2.72
ns_i, non-smoking seating	−0.02*	−0.01**	−0.02*
	7.68	2.54	6.76
$alcohol_i$, % alcohol revenues	0.02*	0.02***	0.01*
	3.41	1.66	2.75
$chain_i$, chain dummy	−0.21	−0.20	−0.29
	0.60	0.40	0.60
age_i, years in business	0.0001	0.004	−0.003
	0.02	0.50	0.43
$seats_i$, number of seats	0.002**	0.002***	0.003***
	2.44	1.75	1.80
Log likelihood	−276.47	−90.11	−229.50
Observations	496	149	347
Obs. with dep = 0	218	88	130
Obs. with dep = 1	278	61	217

Notes: *t*-statistics below estimated coefficients; *, **, and *** denote significant at 0.01, 0.05, and 0.10 levels, respectively.

with no restrictions, and 81% of bar owners. Responses support the above prediction that owners not subject to laws predict profit losses more often than those currently subject to smoking laws. The higher percentage of bar owners predicting profit losses than restaurant owners is also consistent with Dunham and Marlow (2000b).

A qualitative choice model estimates the probability that a restaurant owner with a given set of attributes reports that bans lower profits. Bar owners are excluded here because a vast majority (81%) of their responses indicated lower profits. The following logit model is estimated and follows the model estimated in Dunham and Marlow (2000b):[11]

$$\text{profitchange}_i = f(ns_i, alcohol_i, chain_i, age_i, seats_i) \quad (1)$$

where ns_i = percentage of seating allocated to non-smoking use, $alcohol_i$ = share of revenues from alcohol, $chain_i = 1$ if firm is a member of a corporate chain; 0 otherwise, age_i = years owner has been in business, $seats_i$ = number of seats.

The dependent variable $\text{profitchange}_i = 0$ if owner has experienced or expects no change or a rise in profit, and = 1 if profit falls. As discussed above, previous studies of individual owners focused on revenues or sales and, because they do not measure profits, do not provide clear measurement of economic effects on owners.

The percentage of seating allocated to non-smoking use ns_i is expected to exert a negative influence on the probability that profits fall since this variable indicates how many non-smokers are served. Profit losses are predicted to be more likely the lower the share of non-smoking seating.

The share of revenues from alcohol, $alcohol_i$, is expected to exert a positive influence on the likelihood of profits falling because higher alcohol revenues indicate a more 'bar-like' atmosphere that is more social. As discussed above, bar owners have been found to be much more likely to experience profit reduction thus suggesting that losses are more likely in restaurants that are more 'bar-like' than other restaurants.

Membership in a chain is measured by $chain_i$ and equals 1 if firm is a member of a corporate chain, and equals 0 otherwise. Whether a business is part of a corporate chain is also expected to influence responses if chain members offer greater accommodation of smokers and nonsmokers as an element of overall corporate strategy. This view suggests that chain members are less likely to experience profit reduction with the expected sign on $chain_i$ being negative.

Age of business, age_i, is hypothesized to positively affect probabilities of profit reduction as accommodation costs may be positively related to age of buildings and older firms may accommodate less, given that they tend to cater to more established and stable customer bases than newer businesses.

Number of seats, $seats_i$, is expected to exert a positive influence when scale economies exist in accommodation when, for instance, it may be cheaper to separate smokers from nonsmokers in larger establishments. Larger restaurants then are predicted to experience profit loss more often because they are more likely to have accommodated relatively more smokers prior to a government ban.

Table 2 displays logit estimations for three samples: all restaurant owners, owners subject to smoking laws (actual

[11] Dunham and Marlow (2000b) find non-smoking seating (negative), chain (negative), age (positive) variables exerting significant influences on their logit model of whether or not an owner experiences a fall in revenues.

Table 3. *Attribute changes (observations in parentheses)*

	Restaurants with govt restrictions or bans ($n=172$)	Restaurants with no restrictions ($n=378$)	All bars ($n=428$)
Effects on consumers			
Raise prices	20% (35)	31% (118)	34% (145)
Lower prices	3% (5)	2% (7)	7% (28)
Introduce promotions	22% (37)	31% (116)	35% (151)
More entertainment	2% (4)	7% (25)	19% (79)
Less entertainment	3% (6)	5% (18)	11% (48)
Lengthen hours	3% (6)	4% (15)	4% (19)
Lower hours	7% (12)	21% (78)	29% (124)
Effects on workers			
Lower benefits	7% (12)	17% (65)	16% (68)
Raise responsibilities	9% (16)	14% (52)	10% (42)

changes) and owners not subject to laws (predictions). Estimation supports expectations concerning non-smoking seating, alcohol revenues and number of seats. Higher shares of non-smoking seating lower the probability that owners expect adverse revenue effects while higher revenue shares from alcohol raise the probability. These effects are significant for all three samples, but are weaker in cases of owners subject to laws. As discussed above, profit losses are less likely for owners subject to laws simply because their customers would tend to be more favorable to those restrictions in the first place than communities that have not adopted such laws. Number of seats exerts a positive influence on the likelihood of profit loss in all three estimations. Membership in a corporate chain and age of business exert no significant effects on the probability of profit loss in any of three estimations.

In sum, logit estimations indicate three significant influences on the likelihood that an owner reports lower profits following a smoking ban: shares of seating devoted to non-smoking use, share of revenues from alcohol, and number of seats.

VI. EFFECTS ON CUSTOMERS AND WORKERS

Consumers can also be affected when owners re-arrange their businesses in response to smoking laws. Table 3 displays economic effects stemming from whether owners raise or lower prices, introduce promotions, raise or lower entertainment, and raise or lower hours of operation. Responses are displayed for three groups: restaurant owners subject to smoking laws (actual responses), restaurant owners not subject to laws (predictions), and all bar owners. Twenty percent of restaurant owners subject to bans, 31% of owners without laws, and 34% of bar owners indicate that bans cause price hikes. In contrast, 3% of restaurant owners subject to laws, 2% of owners without laws, and 7% of bar owners indicate that bans cause price reductions.

Twenty-two percent of restaurant owners subject to laws, 31% of restaurant owners without laws, and 35% of bar owners indicate that bans cause them to introduce promotions. Few restaurant owners indicate that bans cause them to raise or lower entertainment; however, bar owners were more likely to indicate entertainment changes.[12] Finally, only 3–4% of all owners indicate that they would stay open longer, but from 7–29% would reduce hours of operation.

Table 3 also displays effects imposed on workers following a smoking ban. Seven percent of owners subject to laws, 17% of owners without laws, and 16% of bar owners indicate that a smoking ban causes them to lower benefits to workers. Nine percent of restaurant owners subject to laws, 14% of restaurant owners not subject to laws, and 10% of bar owners indicate that they have or would raise responsibilities of workers.

An important implication here is that evidence of gains or no change in profits indicate only that laws exert no adverse economic effects on owners, but reveals nothing about attribute changes that influence the welfare of customers and workers. Table 4 summarizes the results of logit estimations where attribute changes are regressed against a variable indicating whether or not an owner experiences a profit reduction. A '+' effect indicates that owners with profit reductions are more likely to undertake a given attribute, while a '−' effect indicates that they are less likely to pursue it. No effects, or blanks in the table, indicate that pursuit of a given attribute is unrelated to whether an owner experiences falling profits.

[12] Nineteen percent would raise entertainment and 11% would lower entertainment.

Table 4. *Summary of whether owners with profit losses undertake attribute changes more often than other owners (+ or − effects, when significant)*

	Restaurants with govt restrictions or bans ($n=172$)	Restaurants with no restrictions ($n=378$)	All bars ($n=428$)
Effects on consumers			
Raise prices	+*	+*	+*
Lower prices			
Introduce promotions	+*	+*	+*
More entertainment		+**	
Less entertainment	+***	+***	+**
Lengthen hours			
Lower hours	+*	+*	+*
Effects on workers			
Lower benefits	+**	+*	+*
Raise responsibilities		+*	

Notes: *t*-statistics below estimated coefficients; *, **, and *** denote significant at 0.01, 0.05, and 0.10 levels, respectively.

Logit estimations indicate that, for all establishments, profit reductions significantly raise the likelihood that an owner raises prices, introduces promotions, lowers entertainment, and lowers hours of operation. Only restaurant owners not subject to smoking laws indicate that profit reduction raises the likelihood of increasing entertainment. Lower benefits to workers are more likely to arise when establishments suffer profit reductions, but only restaurant owners not subject to smoking laws are more likely to raise responsibilities when profits fall. Probabilities of undertaking price drops and lengthening hours of operation are unrelated to whether or not there is a profit reduction.

VII. CONCLUSIONS

This study is an initial attempt at uncovering the economic effects of smoking laws experienced by owners, customers and workers. While previous research by public health advocates has focused on health benefits enjoyed by non-smoking customers and restaurant workers, a thorough assessment of the effects of smoking laws should also include economic benefits and costs that extend to owners, customers and workers.

This examination of Wisconsin restaurants and bars indicates that smoking bans exert effects on profits that vary by establishment, and that bars are much more likely to experience profit losses than restaurants. Owners not subject to laws more often stated that bans lower profits, but this result is consistent with the view that locations with smoking laws service relatively few smokers. This suggests that predictions of profit loss are likely to be understated when they are projected onto other localities because locations with laws tend to service relatively fewer smokers than locations without laws.

Economic effects experienced by owners extend beyond those who cater to many smoking customers. In addition to seating devoted to non-smoking use, which measures importance of smoking customers, alcohol sales and size of restaurant influence the probability of lower profits. Owners of larger 'bar-like' restaurants are more likely to experience lower profits than others, holding constant the degree to which they cater to smokers.

Economic effects are also found to extend beyond owners as bans lead to changes in prices, promotions, entertainment, hours of operation, and benefits and responsibilities of workers. Most actions were found to be more likely when establishments experience a profit reduction, and effects are not isolated to smokers.

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Economic Impact of Smoking Bans

"There are three kinds of lies: lies, damn lies and statistics"

Mark Twain's Autobiography (1924), quotes this as a remark attributed to Benjamin Disraeli

Smoking ban proponents often point to studies purporting to show smoking bans have little to no economic impact. However, these studies are often contradicted by many business owners' personal experiences, as well as studies and experiences indicating smoking bans are bad for business. It is ironic that ban proponents often discredit the oppositions' understanding of Environmental Tobacco Smoke (ETS) science, while professing to comprehend the potential economic impact better than those in the hospitality industry.

When looking at ban-supporters' economic claims, be aware that they will:

- Include fast-food and other locations that haven't allowed smoking for years;
- Exclude those places that have closed during the reporting period (partial-year licensees);
- Point to marginal economic growth while surrounding jurisdictions experience significantly increased business; and
- "Cherry-pick" data to support their assertions

The bottom line for economic impact is simple: smoking bans most impact businesses that serve smokers as a significant portion of their customer-base. When government-mandated smoking bans are implemented, <u>all</u> restaurant and bar owners suffer a loss of freedom.

Below are excerpts from a few of the more prominent and recent studies regarding the economic impact of smoking bans (see enclosed disk for full-text):

Dallas Restaurant Association Study

In January 2003 the Dallas City Council passed a smoking ban in restaurants, hotels, bowling centers and other public places effective March 1, 2003. One year later, the Dallas Restaurant Association asked two professors of applied economics at the University of North Texas in Denton to examine the effects of the smoking ban a year after implementation. The study found that the smoking ban:

- ***Contributed to an $11.8 million decline in alcohol sales.***
- ***Restaurants experienced drops in alcohol sales ranging from 9% to 50%.***
- ***Caused at least 4 restaurant closings.***

("The Dallas Smoking Ordinance One Year Later; A Report on the Impacts of the City of Dallas Smoking Ban on Alcoholic Beverage Sales", Terry L. Clower, Ph.D. & Bernard L. Weinstein, Ph.D., October 1, 2004)

New York Nightlife Association/Empire State Restaurant and Tavern Association Study

In July 2003 the state of New York banned smoking in all enclosed public places of employment. In May 2004 Ridgewood Economic Associates, Ltd. conducted a study on the impact of the ban on bars and restaurants. The study found that that ban had cost the bar and tavern industry:

- ***2,000 jobs (10.7% of actual employment)***
- ***$28.5 million in wages and salary payments***
- ***$37 million in gross state product***

("Economic Impact of the New York State Smoking Ban on New York's Bars", Ridgewood Economic Associates, Ltd. May 12, 2004)

National Restaurant Association Study

In 2004, the National Restaurant Association engaged Deloitte & Touche LLP to study the economic impact of smoking bans in thousands of restaurants. The study examined the impact of government-imposed smoking bans on the sales and profits of individual table service restaurants. The analysis used data from national samples of restaurants collected during five different years during the 1990 to 2000 period. The study included information on the features of the ordinances applicable to the restaurants and the economic and demographic characteristics of the communities where the restaurants were located. The research found:

- ***Non-smoking ordinances have a statistically significant impact on the sales and profits of individual restaurants in certain cases.***
- ***A temporary negative impact on restaurant sales was found in cases where 100 percent smoking bans (excluding the bar area) were in effect at the county level. The estimated declines in annual sales ranged from roughly 49 to 55 percent at restaurants where such bans were enacted two to three years prior to the survey.***
- ***Restaurant sales declined in areas where 100 percent smoking bans (excluding the bar area) had been enacted at the place level. Annual sales declines were estimated at 36 percent at restaurants where these bans were enacted four or more years earlier.***
- ***In cases where significant declines in sales were estimated, gross profit tended to decline by a somewhat greater percentage.***
- ***A positive impact on total restaurant sales and gross profit was found in cases where place-level ordinances reserved the majority of seating for nonsmokers but allowed some smoking. In cases where these ordinances were enacted two to three years before the survey, sales were estimated to increase 36 percent and gross profit was up 37 percent. In cases where these ordinances went into effect four or more years ago, sales were up 43 percent and gross profit increased 42 percent.***

("The Impact of Non-smoking Ordinances on Restaurant Financial Performance", Deloitte & Touche LLP, February 2004)

Restaurant Association of Maryland Study

In October 2003 Montgomery County passed a smoking ban in most enclosed public places, including bars and restaurants. In April 2004 Talbot County began enforcing a similar ban. The Restaurant Association of Maryland tracked tax data from the Maryland Office of the Comptroller and found:

In **Montgomery County** between April and December 2004:

- ***Sales tax receipts for restaurants with liquor licenses grew by only $110,480, or .025 percent, while receipts in neighboring Frederick County grew 7 percent over the same period.***
- ***The number of restaurants with liquor licenses fell to 402 by the end of December 2004 from a high of 526 in March 2003.***
- ***The number of beer keg sales declined by 2,366 kegs.***

In **Talbot County** between May 2004 and December 2004

- **Restaurant sales tax receipts fell by $2.9 million or 11 percent, while sales for similar establishments in neighboring Caroline County increased by 36 percent and in Dorchester County by 14 percent.**
- **The number of restaurants/bars with liquor licenses remitting sales tax to the State declined from a high of 39 establishments in November of 2003 to a low of only 29 establishments by the end of December 2004.**

(Independent data analysis by the Restaurant Association of Maryland, Melvin Thompson)

Economic Impact of Smoking Bans in Ottawa, London, Kingston and Kitchener, Ontario

In a February 2005 study conducted by Michael K. Evans, Ph.D of Evans, Carroll and Associates of smoking ban in bars and pubs In Ontario, Canada, the results were striking. The analysis determined:

- ***After the imposition of the smoking ban, sales at bars and pubs were 23.5% lower in Ottawa, 18.7% lower in London, 24.3% lower in Kingston, and 20.4% lower in Kitchener, than would have been the case with no smoking ban.***

("The Economic Impact of Smoking Bans in Ottawa, London, Kingston, and Kitchener, Ontario", Michael K. Evans, Ph.D., February 2005)

The Dallas Smoking Ordinance One Year Later

A Report on the Impacts of the City of Dallas Smoking Ban on Alcoholic Beverage Sales March 2003 to March 2004

October 1, 2004

Prepared by:
Terry L. Clower, Ph.D. & Bernard L. Weinstein, Ph.D.*

Prepared for:
The Greater Dallas Restaurant Association
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*Drs. Clower and Weinstein are professors of applied economics at the University of North Texas in Denton. Views expressed are the authors' alone and do not necessarily reflect those of the university, its officers or regents.

Overview

In January 2003, the Dallas City Council passed a comprehensive smoking ban that covered restaurants, hotels, bingo halls and bowling centers in the city. On March 1, 2003 this ordinance took effect.

As the Dallas smoking ban passed its first anniversary this past March, questions continued about its impacts on restaurants, hotels, and drinking establishments where food sales qualify them as restaurants in the language codified in the non-smoking ordinance.

In January 2003, the Greater Dallas Restaurant Association asked us to review the impacts a smoking ban had on the City of Carrollton in the mid-1990's and the potential impacts such a ban would have on Dallas. We found a significant impact did occur in Carrollton (which later rescinded its ordinance) and urged Dallas policymakers to adopt smoking restrictions that focused on accommodation, not discrimination.

In March of this year, the Dallas Restaurant Association asked us to review the one year impact of the Dallas smoking ordinance on City of Dallas restaurants. However, there is three to four month delay in getting monthly sales information from the state comptrollers office, so a full year analysis of data was not possible until late this summer.

The following is a report on our efforts to measure the effect, if any, of the smoking ban on revenues at affected City of Dallas establishments.

For this report, we evaluated alcoholic beverage sales data available from the State of Texas Comptrollers Office, reviewed a survey conducted by the Greater Dallas Restaurant Association, and analyzed information obtained from press reports during the first quarter of this year.

Our preliminary findings indicate the Dallas smoking ban ordinance

- ***Contributed to a decline in alcohol sales in the City of Dallas***
- ***Negatively impacted revenue at many restaurants in Dallas***
- ***Caused at least four restaurant closings***
- ***Appears to be changing the business models used by hospitality business owners in Dallas.***

The findings also track the trend experienced in Carrollton, Texas where a government imposed smoking ban led to a decline in alcohol sales and a loss of restaurant development and tax dollars in the city.

Earlier this year a news report focused on whether Dallas was at a "Tipping Point" in its effort to remain in the top tier cities in the nation. Based on our review, the city is clearly at "Tipping Point" in regards to encouraging hospitality development in the city. Not only has the smoking ordinance impacted operations at many restaurants; it has changed the perception of the

city within the hospitality community. To many in the industry, Dallas has lost its way in encouraging hospitality development in the city. This has significant implications for a city that is surrounded by suburban cities that are perceived as more hospitality industry friendly.

Assessing the Impacts of Smoking Ordinances

There are several challenges in assessing the impact of smoking bans. Proponents of smoking bans often cite retail sales tax receipts in their impact assessments. However, this data can be misleading.

First, sales tax data typically reported for the restaurant industry provide no break-out for the variety of restaurant types. Fast food establishments, bar food sales, corner diners, and upscale steak houses are all included in the same set of data. Many of these establishments, especially fast food and family-style restaurants and buffets, which comprise a significant majority of restaurants in most cities including Dallas, were already non-smoking before the ban. Moreover, a sizable portion of food sales at these establishments is take-away or drive-through purchases. The presence or absence of a smoking ban probably makes no difference on sales at these types of eating places.

Thus, any claims about the absence or presence of an impact on restaurant sales based solely on broad measures of food sales tax receipts for the entire industry are simply based on invalid measures and should be viewed with suspicion by policy makers.

Full Service Restaurants Most Affected by Smoking Bans

From our preliminary review of the data, smoking bans appear most likely to affect full service dining establishments, particularly those that have a restaurant bar or serve cocktails, where a part of the ambiance is having a glass of wine or cocktail and conversation before and after the meal.

More importantly for restaurateurs, the additional time spent at the table by customers usually means additional revenue. Alcoholic beverage sales represent a sizable proportion of the profits for upscale dining establishments. It has been the experience of restaurateurs in cities where smoking bans are in place that if one or more members of a dining party are smokers, the time at the restaurant is reduced. The meal itself still takes the same amount of time to be consumed, but the time spent before and after the meal is decreased, resulting in lower alcoholic beverage sales for the restaurant.

The Carrollton Texas Experience

Our 2003 evaluation of the impact of the smoking ban imposed on Carrollton's restaurants in the mid-1990s, which had a sizable number of fast food and family style restaurants where no alcohol was served, found little impact on food sales at most restaurants (there were exceptions), but a significant impact on alcoholic beverage sales at restaurants. Moreover, according to city economic development staff, the ban negatively affected their ability to attract new restaurants into that city.

Carrollton offered an excellent opportunity to study the impact of a smoking ban empirically. The city imposed the ban in January 1995 and then decided to rescind the ban in December 1998. Our analysis found that alcoholic beverage sales decreased by an average of 11 percent during the smoking ban, imposing a substantial burden on that city's restaurants. Once the ban was removed, beverage sales rose again. While there are some challenges in assessing whether or not the Dallas smoking ban has had a similar impact on alcoholic beverage sales at restaurants, preliminary data indicate that it could.

The Dallas Experience: Alcohol Sales Down $11.8 million

An analysis of data from the State Comptroller's office finds that alcoholic beverage sales receipts in Dallas substantially declined in 2003 versus 2002. The smoking ban was in effect during most of this period and the highly-publicized city council deliberations on the smoking ban occurred in January and February.

After several years of strong growth in alcoholic beverage sales, sales at Dallas' restaurants showed a small year over year decline between 2000 and 2001 totaling about $370,000* (see Figure 1 below). Considering the dual effects of an economic downturn and the impacts of the 9/11 attacks on consumer spending at hospitality venues, this decrease offers little surprise. Moreover, as the impact of the tech-wreck extended the loss of regional business activity well into 2002, alcoholic beverage sales dropped an additional $4.1 million compared to 2001. As the regional economy stabilized and began showing early signs of returning growth, expectations rose that consumers would regain their desire for fine dining accompanied by alcoholic beverage sales. However, for Dallas' restaurants the pain grew worse. Comparing 2003 to 2002, year over year sales of alcoholic beverage at eating and drinking establishments in Dallas fell $11.8 million – almost three times the decrease in sales between 2001 and 2002.

Importantly, Dallas' experience contrasts with the success of most of its regional competitors in the hospitality sector. Based on mixed beverage sales tax rebates from the Texas Comptroller, with one exception, Dallas's biggest dining competitors saw year over year gains in alcoholic beverage sales between 2002 and 2003 ranging from a 3.2 percent increase in Richardson to a 12.2 percent increase in Frisco. Only Irving, whose sales were essentially flat (declining less than one percent) did not see year over year gains in alcoholic beverage sales between 2002 and 2003. Statewide, mixed beverage sales tax rebates to cities averaged 1.9 percent (see Figure 2).

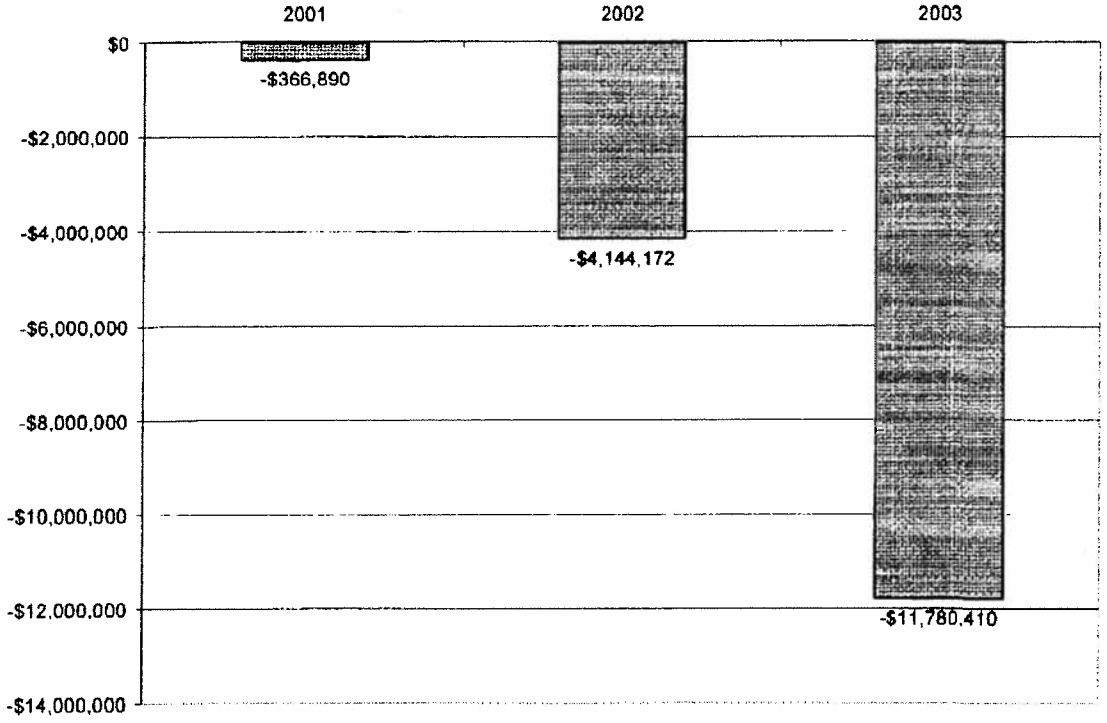
These losses in Dallas represent a significant decrease and should be of concern for Dallas policy makers as they demonstrate the city is becoming less of a destination of choice for hospitality venues. They also clearly demonstrate the new ordinance is not drawing people into Dallas bars and restaurants as proponents of the ordinance forecasted.

The Dallas ban on smoking was imposed at a time when the Dallas economy was at the nascent stage of a "jobless" economic recovery and accompanied by declining per capita income. With a depressed local economy, it is more difficult to tease out the specific impacts of the

* Year over year sales are based on the previous 12-month total sales for January 2001, 2002, 2003, and 2004, respectively.

smoking ban. Methodologically, the best way to approach this type of analysis is to look for indications of an impact over a period of time. Moreover, any affects the smoking ban may have on restaurant locations will potentially take years to be fully realized due to building leases and similar contractual obligations.

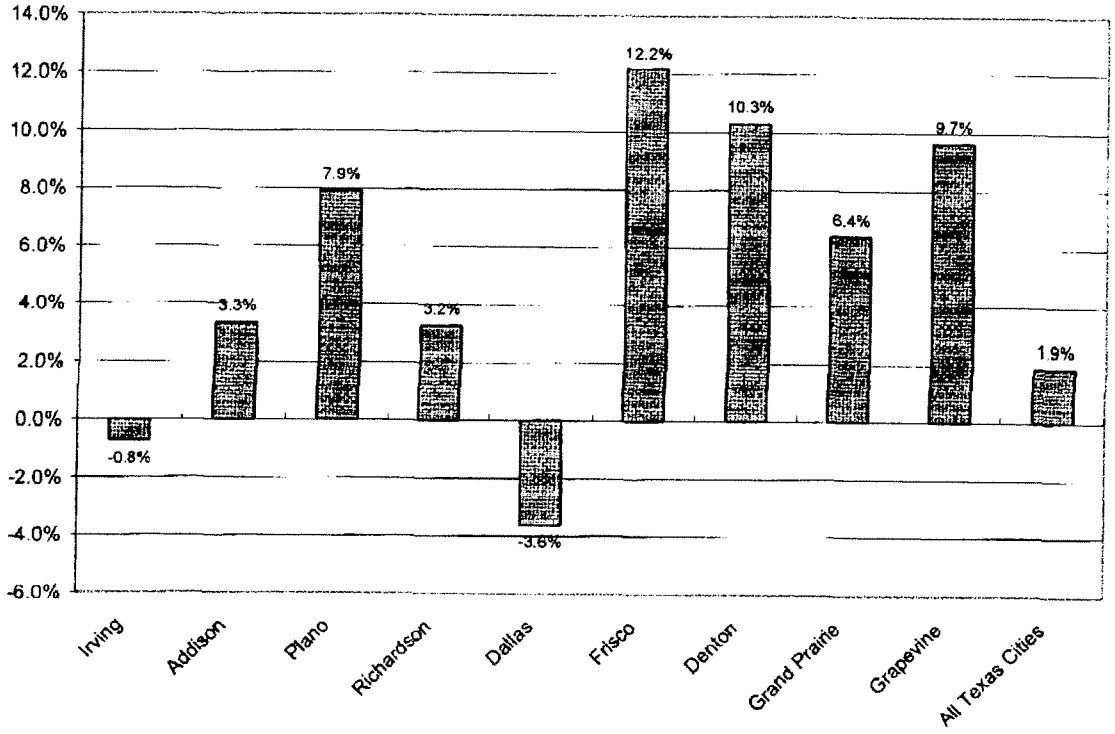
Figure 1
Year-Over-Year Change in Alcoholic Beverage Sales*
In the City of Dallas at Eating and Drinking Establishments



Source: Texas Comptroller of Public Accounts

Figure 2

Percentage Change in Year over Year Alcoholic Beverage Sales at Eating and Drinking Establishments 2002-2003*



Source: Texas Comptroller

The apparent loss of competitiveness of Dallas' bars and restaurants should be of great concern to Dallas' elected officials, not only for the potential impact it could have on hospitality venues, which provide significant property tax revenues into the city each year, but also for the impact this increasing loss will have on sales tax dollars and the city budget in years ahead. These preliminary findings are supported with anecdotal evidence offered by some of Dallas' premier restaurants that the smoking ban has clearly had a negative impact on alcoholic beverage sales.

Restaurant Industry Survey Reports Alcohol Sales Losses Range from 9% to 50% Since Ban Was Passed

Among the restaurant community it is a given that the smoking ban has had an effect, in some cases a significant effect, on some restaurants and has led to the perception that Dallas is losing its hospitality industry friendly reputation.

In a survey conducted in the first quarter of this year, The Greater Dallas Restaurant Association (GDRA) asked its members to respond to a short questionnaire. The survey asks restaurant owners or managers the following questions:

- Do you have a bar?
- Has your bar experienced a loss in sales since the smoking ban was imposed?
- What was the percentage loss?
- Have you experienced a loss in sales in the dining room since the ban?
- What is the percentage of loss?
- Has your restaurant experienced an increase in sales that you attribute to the smoking ban?
- Can you share comments on the ban from your patrons?

The question regarding an increase in sales addresses a specific prediction issued by proponents of the smoking ban that there are thousands of patrons who did not dine in Dallas restaurants because of the presence of smokers somewhere in the building.

According to responses received by the GDRA, restaurant owners have seen alcoholic beverage sales decline anywhere from 9 percent to over 50 percent since the Dallas smoking ban went into effect. Owners and managers of these establishments report mixed results in food sales, with one restaurant indicating no impact on food sales while others claim as much as a 25 percent loss in food sales. No responding restaurant indicated they had gained revenues since the smoking ban's inception

The year 2003 was certainly one of upheaval for the Dallas restaurant and bar trade. Venerable and well-respected establishments such as Marty's, The Riviera, Il Sorento, and Star Canyon closed their doors. Other casualties of note include Matt's No Place and Liberty Noodle. While the economy is certainly one factor, and the significant loss of convention and business meetings in Dallas another, the timing of the ban clearly has reduced revenues in the restaurant sector for some properties and been the "straw" that broke the financial backs of other properties.

We caution that these observations do not necessarily represent the experience of those restaurants not responding. But there is no doubt those who reported a loss of sales associate their declining revenues with the smoking ordinance.

Indeed, ancillary sales are also affected by the smoking ban. One top-of-market steak house reported losing between $10,000 and $15,000 per month in cigar sales since the ordinance took effect—this after having spent $50,000 on air filtration equipment to make sure that smoking and non-smoking patrons could equally enjoy their dining experience.

The Smoking Ban is Changing the Way Hospitality Owners Do Business in Dallas

As suggested above, Dallas may not have seen the full effect of the changing competitive landscape precipitated by the smoking ban. Full-service, upper-end restaurants may be less

inclined to keep a location in Dallas. However, they are under existing building leases and could face substantial financial penalties for moving before their leases expire.

The City of Dallas is also facing a changing competitive environment in the hospitality trade. The center of population is moving north and west of the city. The cities around Dallas are making their communities more hospitality friendly in attracting quality restaurants and other eating and drinking venues. The recent positive response to local wet-dry options in McKinney, Allen, and Rowlett in all likelihood will make these suburbs even more attractive to restaurateurs. These and other Dallas competitors have growing populations, relaxed alcoholic beverage sales requirements, and smoking ordinances that recognize the value of letting restaurant managers decide how best to serve their clientele. It is telling that no other cities in the region or state have followed Dallas' lead in adopting very restrictive smoking ordinances.

Both Austin and San Antonio passed new smoking ordinances in 2003 that allow smoking in restaurants or restaurant bars in some fashion. The City of Allen, immediately after Dallas passed its smoking ban ordinance, passed a smoking ordinance resembling those adopted by its neighboring cities of Frisco and Plano, not Dallas.

From press reports, it appears the negative effects of the smoking ordinance are not limited to restaurants. The hotel community has also suffered from the ban. Two conventions moved their meetings to suburban locations shortly after the ban was announced. Here, too, the City of Dallas has put in place regulations that ban smoking in hotel private meeting rooms and banquet facilities that run counter to the market. No other city in the Dallas area has such restrictions, putting the Dallas hotel community at a competitive disadvantage in attracting those private meetings where smoking may be requested as an option.

While the *region* still enjoyed the economic benefits from these visitors, the City of Dallas lost business and tax revenues. Hoteliers are reporting, at least anecdotally, a decline in interest in the City of Dallas as a meeting site in part because of the smoking prohibitions.

With less onerous smoking ordinances and new competition in the suburbs—most notably the Gaylord Texan Resort and Conference Center in Grapevine—Dallas' hospitality venues will be hard-pressed to attract the level of meeting and banquet business to which the city has grown accustomed.

Conclusions

Sufficient evidence exists to suggest that at least some of Dallas' premier restaurants have lost business because of the smoking ban. Their revenue losses translate into fewer jobs and lost tax revenue to the City. The hordes of new customers looking for smoke-free dining experiences have not shown up at the tables. Moreover, there is little indication that its suburbs are following Dallas' lead and adopting stringent smoking regulations for their hospitality venues. Therefore, Dallas' smoking ban will continue to push existing and new restaurants and hotels to the suburbs with associated loses to local jobs and tax revenues.

A prudent course of action for the City of Dallas, given its relatively weak economic performance and substantial need for tax revenue, would be to rescind the ban and direct the

efforts of eliminating smoking in dining establishments towards a statewide change in law that would allow Dallas' restaurants to compete on a level playing field.

Elected officials should be wary of generalized studies indicating no impact is occurring on restaurants in Dallas. While there are many confounding factors in measuring the true impact in the aggregate, there are clear indications that the smoking ordinance, one year after enactment, is contributing to restaurants and other hospitality venues in Dallas losing business at greater rates than before the ordinance was passed.

New or revised studies will probably be released showing that the smoking ban in Dallas has had no impact on restaurant sales. And, there will likely be some individual restaurants that will report an increase in overall sales after the ban was imposed. However, as suggested earlier, reports used by smoking ban proponents are often based on data that are not disaggregated enough to examine the presence of any potential impact on businesses most likely to be affected. Moreover, even if overall restaurant sales are higher than the same month as last year, that may only reflect the return of local consumer confidence—actual sales could have been even higher without the ban.

The full effect of the smoking ban may not be fully realized for many months, possibly years. As existing leases expire, restaurants negatively affected by the smoking ordinance have more flexibility in considering a change in location, moves that will be encouraged even further if local suburban voters choose to allow greater freedom for restaurants to sell alcoholic beverages in their communities. Unfortunately, once restaurants have relocated to the suburbs, it will be too late to reverse the trend.

We urge Dallas officials to review whether their policies are harming one of the most reliable sectors of the city's economy. At a time when population and economic shifts continue to push activity to the suburbs, it makes little sense for policymakers to put the city's hospitality businesses at a competitive disadvantage. Doing so certainly detracts from Dallas' hard-earned regional and national reputation as a hospitality industry friendly city.

The Economic Impact of the New York State Smoking Ban on New York's Bars

Prepared for the

New York Nightlife Association

Empire State Restaurant and Tavern Association

This document was prepared on
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About REA and its Founder, Brian O'Connor, Ph.D.

Brian O'Connor, formerly IBM's director of U.S. economics, is credited with creating a database combining elements of macroeconomics, industry and regional forecasting to gauge the impact of the economy on the company's business. He established an internal consulting practice to serve the planning needs of IBM U.S. and many of its key clients.
Brian's doctorate, at the University of Maryland, was in input/output analysis and econometric modeling. He served as technical consultant to the Federal Trade Commission in the late 1960's, where he designed a quantitative system to support the agency's enforcement mission.

Brian came to IBM in 1969 to develop an input/output model for forecasting the industrial composition of the United States. He took over the running of IBM's quarterly econometric model in 1975 and was responsible for all U.S. macroeconomic forecasting: assessing current conditions, evaluating public policy and providing IBM senior management with economic forecasts to run its domestic operations.

For twenty-five years, he has worked with IBM and customer executives to help them assess the impact of economic conditions on their businesses, to anticipate developments in their markets and to track their performance against potential.

In 1993, Brian founded Ridgewood Economic Associates (REA), a consulting firm, dedicated to helping business clients meet the challenge of today's competitive environment. Its primary focus is on the development of economic databases and a system of interlocking forecasting models designed to improve operating and strategic planning systems.

For the last few years, Brian has held the position of Senior Technical Consultant to Texas Perspectives, Inc., an economic consulting firm based in Austin, Texas which specializes in regional economic and public policy analysis.

The Economic Impact of the New York State Smoking Ban on New York's Bars

I. Executive Summary

Since its passage in July 2003, a significant amount of anecdotal evidence has suggested that New York's statewide smoking ban has negatively affected bars, clubs and taverns across New York State. Countless media accounts have described a dramatic drop in customers for bars throughout the state, as well as a steep decline in bar revenue and significant job losses.

To date, the only statistical evidence put forth to gauge the ban's economic impact has analyzed the combined revenue and job totals from both restaurant and bar industries. The following economic study is the first detailed economic analysis focused exclusively on the economic effects of the state smoking ban on New York State's bars. This report measures the direct and indirect economic impact of the New York smoking ban on bars, taverns and clubs*.

The major findings are that the passage of the state smoking ban in 2003 has directly resulted in a dramatic loss in revenue and jobs in New York's bars, taverns and clubs.

Specifically, the following statewide economic losses have occurred in New York's bar and tavern industry as a direct result of the statewide smoking ban:

- 2,000 jobs (10.7% of actual employment)
- $28.5 million in wages and salary payments
- $37 million in gross state product

In addition, there are indirect losses to other businesses which supply and service the state's bars and taverns:

- 650 jobs
- $21.5 million in labor earnings
- $34.5 million in gross state product

In summary, the enactment of the New York State smoking ban has had a dramatic negative impact on the bar and tavern business and related businesses. The total economic impact is:

- 2650 jobs
- $50 million in worker earnings
- $71.5 million in gross state product (output)

**This analysis, defines bars, taverns and clubs using the following North American Industry Classification System (NAICS) definition: "This industry comprises establishments known as bars, taverns, nightclubs, or drinking places primarily engaged in preparing and serving alcoholic beverages for immediate consumption. These establishments may also provide limited food services."*

Direct Economic Impacts

The main focus of the economic analysis is on industry employment. While industry revenue would be a preferred indicator of industry economic health, these data are normally not available at the regional level on a consistent basis over time. In these instances, economists tend to study industry employment patterns. An industry employment function was estimated separately for the bar/tavern and restaurant industries. A multiple regression approach was used to explain the number of employed workers in each industry as a function of personal income, an industry price factor and proxy variables to capture the impacts of anti-smoking regulations and the transitional recovery from the 2001 attack on the World Trade Center. These functions were estimated at the state level, using a log - log format (see Appendix II for the regression results).

The employment function for the bar/tavern industry exhibited strong statistical properties. The coefficient of the price deflator is negative, reflecting the normal inverse relationship that exists between price and sales volume and, in a derived manner, with employment. Adjusting the estimated price impact from the regression by industry labor productivity, the price elasticity of demand (customer sensitivity to changes in product price) is -1.9. The magnitude of the number puts the elasticity in the elastic zone, indicating a relatively high price sensitivity of bar/tavern patrons to prices. The income elasticity (the responsiveness of product demand to changes in consumer income) derived from the employment function is estimated to be 1.65, indicating that the bar/tavern industry provides products that economists call "normal" goods. These types of products respond positively to income gains. Both elasticities are consistent with the existing body of research literature.

Employment losses from the anti-smoking regulations are estimated by comparing two versions of industry employment predictions. The first estimate of employment comes from the fitted regression with the ban-coverage proxy variable coded to reflect the current status of these regulations. The alternate estimate uses the same regression parameters, but sets the proxy variable to zero to simulate the removal of all anti-smoking rules. The difference between these two estimates indicates that approximately 2,000 jobs (10.7% of actual employment) were lost in New York State last year.

Using data from the New York State Department of Labor, the average wage per employed worker in 2003 was approximately $14,175 per year. Combining the job loss with the average annual worker compensation estimate, lost wage and salary payments amounted to $28.5 million in 2003. These 2,000 workers would have added nearly $37 million to constant-dollar Gross State Product (output) in New York State.

A similar approach was used to calculate loss jobs in the restaurant industry. The price elasticity of restaurant meals is quite similar to the price sensitivity of bar/tavern patrons (-1.8 versus -1.9 for bars). However, in contrast, the income elasticity in this segment of the hospitality industry is significantly greater than for bars/taverns. Based on the fitted regression, the elasticity is approximately 2.1 (versus 1.65 for bars/taverns). This

difference is a major reason why the recent employment pattern in the restaurant industry is substantially stronger than for bars/taverns. The upturn in general economic conditions, combined with the increase in State tourism following 9/11, have added significant income to the local economy. Also, the data analysis suggests that the impact of the anti-smoking regulations is smaller on restaurants than on bars/taverns.

Indirect Economic Impacts

These direct output/employment/earnings effects are only the first wave of economic change. In addition to the direct economic impacts, there are indirect and induced changes to the local economic landscape. A system of regional input/output multipliers was used to assess these total changes. These effects are: (1) the change in output for a given industry needed to meet the initial dollar change in spending by final users (customer purchases at bars/taverns); (2) changes in the output of all industries to meet the direct requirements of a given industry; (3) changes in the output of all industries to meet the changes in production in (2) above; and (4) the regional production required to meet changes in demand by final users created by higher local income generated by the first three effects. These regional impact factors were developed by researchers at the U.S. Bureau of Economic Analysis, U.S. Department of Commerce. These output, employment and earnings multipliers provide the basis for translating the estimated direct impacts on the bar or restaurant industry into total economic change.

The New York State employment multiplier for the bar and tavern industry is 1.33. This factor implies that for each job created in the bar industry, the ultimate change in employment across all industries in New York State is 1.33 jobs. The direct loss of slightly more than 2,000 workers from the 2003 smoking ban regulations means a total reduction in job count of more than 2,650 jobs across the State.

The local regional earnings multiplier is 1.76, indicating a decline of $1.76 dollars for each dollar lost in the bar/tavern industry. The direct earnings loss of $28.5 million by workers in the bar/tavern industry would result in a total change of labor earnings of $50 million. When the indirect impacts are taken into account, the $37 million loss in gross state product by the bar industry would translate into a total decline in production of slightly more than $70 million. These losses are occurring in the context of the current weakness in local job markets and the lack of strong growth in the State's economy.

Conclusion

New York State's public smoking ban has resulted in dramatic economic losses in bars and taverns across the state. This reduction translates into a negative overall economic impact in 2003 of more than $70 million in economic activity, $50 million in lost wages, and the elimination of more than 2,650 jobs statewide. These dramatic economic losses to the state should be factored into the public policy debate going forward.

II. Background

Overview

Restrictions on the time, place and manner in which public smoking may occur have been increasing over the last several years. While the early focus of anti-smoking initiatives was on consumer education and industry advertising restrictions, over past two decades, smoking opponents have increasingly taken their battle to state and local governments, seeking prohibitions on smoking in a wide variety of public establishments. Advocates of these bans claim to be protecting the nonsmoking public and workers from the adverse health effects of secondhand smoke. Opponents of smoking restrictions dispute the existence and/or severity of these adverse consequences and claim that bans have the unintended consequence of hurting business.

State and Local Smoking Ordinances Nationwide

Nationwide, the number of local communities implementing full or partial bans on smoking in public facilities --including worksites, bars and restaurants -- has increased more than eight-fold over the past two decades. More than 200 U.S. municipalities had local clean indoor air laws in effect during 1985; by April 2004, over 1,700 communities had enacted such laws.1 Almost one-third of the U.S. population now is subject to some type of smoking restriction, with various combinations of constrains being imposed.

Some smoking laws are less restrictive than others. Many provide for full or partial bans on smoking; some apply only to workplaces, restaurants, or bars, or a combination of these three.

A total of 80 out of 291 municipalities with 100% smoke free provisions apply that restriction to all three target environments - workplaces, restaurants, and bars, more than four times the number of communities with such full-scale bans in effect in the year 2000. Approximately one-third of the U.S. population is estimated to live in areas covered by these ordinances and laws providing for 100% smoke free workplaces, restaurants and bars.

While these 80 municipalities are scattered across 15 states, Massachusetts (with 45 such areas) and California (with 11) account for 70 percent of the total. Eight states have only one municipality within their borders that has this blanket prohibition. The first such comprehensive ban was enacted just over 11 years ago, and the movement did not grow rapidly, reaching a total of just 20 localities over seven years by 2000. Sixty more municipalities have signed on to full-scale bans since then.

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[1] *See http://no-smoke.org/lists. Unless otherwise noted, all data concerning the spread of smoking ban ordinances in* the United States are derived from the ANRF surveys reported at this website.

Statewide Bans

While every state except Alabama has some kind of clean indoor air legislation or policy in effect, only a handful have enacted complete smoking bans in workplaces, restaurants, or bars. Proposed anti-smoking regulations failed to pass in at least 21 states during 2003.

As of April 2004, a total of eight states had enacted 100% smoke free bans in workplaces, restaurants, or bars. In most cases, these laws are more stringent than any local ordinances that preceded them, creating potential conflicts between local and state requirements.

California and Utah initiated the process, with laws banning all smoking in restaurants that took effect January 1, 1995. Three years later, California extended this prohibition to all free-standing bars in the state.

At the time it implemented the statewide ban in restaurants, California was at the tail end of a recessionary period, with the economy exhibiting essentially zero growth. Nevertheless, eating establishments that do not serve alcohol had increased sales of about 11.7 percent in the four years leading up to the ban, while restaurants and bars increased sales by just 1.2 percent. Following the ban, taxable sales statewide increased by 31.9 percent in the following five years, but restaurants and bars were well below this figure, and more than a thousand went out of business.2

More than seven years passed before another state, South Dakota, implemented a smoking ban. South Dakota's ban applied only to workplaces, exempting alcohol-serving restaurants and bars. One of the interesting and unanticipated consequences of this legislation was the surge in applications for liquor licenses by restaurants that had previously been dry. The law exempted restaurants that served alcohol, and many business owners felt it necessary to begin serving alcohol so that their patrons could continue to smoke and their revenue streams would be safeguarded.

Delaware's ban was signed into law in November 2001. Delaware's law included a pre-emption provision under which municipal governments couldn't implement their own anti-smoking policies. Similar preemption laws are included in state laws in 18 other states. The Delaware smoking ban was modified in March 2003. Among other things, the amendment permitted smoking in bars, casinos that install air systems, and nursing homes.

About a year later, Florida banned smoking in workplaces and restaurants. In contrast to most other states where bans have been put into place, the issue was settled by voter referendum (November 2002), rather than enacted as legislation by state lawmakers.

Connecticut banned smoking in restaurants effective October 1, 2003, and extended the

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[2] See http://www/forces.onz/evidence/files/ban-csr.html.

ban to bars on April 1, 2004. Workplaces remain free of state restrictions. The ban exempts private clubs and the state's two casinos. While an analysis of the impact of this law has not yet been prepared, some Connecticut bar owners claim to have seen a drop of 60 percent in revenues as smokers flock to places where they can still light up while they drink, and these owners are forming an alliance to fight for repeal of this measure.

Maine implemented full bans on smoking in restaurants and bars at the beginning of 2004, keeping workplaces free of state intervention. Within weeks of the ban's effective date, the Associated Press reported that many restaurant and bar patrons were driving across the border to New Hampshire or Canada in order to avoid standing out in the winter cold if they wished to light up. An unusual degree of opposition has arisen in Maine, with one former state representative going so far as to advise bar owners to file a class-action suit against the measure.

New York Smoking Policy

In August of 2002, New York City Mayor Michael Bloomberg signaled his intention to prohibit smoking in establishments that had been exempted from the City's earlier smoking ban enacted in 1995. Free-standing bars, smaller restaurants, pool halls, bingo parlors and bowling alleys were now to be required to implement smoke free policies and environments. Predictably, there was much acrimony in the months that followed, as representatives of the city's 13,000 bars and smaller restaurants that had allowed smoking complained businesses would suffer, while public health advocates pushed the case for protecting the tens of thousands of customers and workers in those establishments from second-hand smoke.

By the end of the year, however, New York City had adopted its new law and businesses had three months to prepare their facilities and clientele for a smoke free environment by the end of March 2003. Many bars and smaller restaurants took advantage of those three months to construct separate smoking areas and install costly ventilation systems that they anticipated would qualify them for exemptions from the ban, as had been negotiated.

However, just days before the New York City ban was scheduled to go into effect, the New York State Legislature approved a statewide smoking ban in workplaces, including bars and restaurants, that was considerably more stringent than the City ordinance and superseded most of the exemptions that had been included in the City version. New York joined just five other states - California, Delaware, Utah, Vermont and Maine - that had implemented smoking bans at that time, and the severity of its provisions was only surpassed by the original Delaware law (which was subsequently weakened with respect to bars).

Comprehensive economic evidence is difficult to assemble with respect to assessing the impact of this new law. In early December of 2003, eight months after the City's ban went into effect, International Communications Research (ICR) released an impact study[3] claiming that:

[3] Reported at http://www.bantheban.ori/archives/009491.php.

- One-third of New York City bars, hotels and nightclubs have reduced staffing by an average of 16 percent since the ban took effect, and three-fourths of them cited the ban as the cause.

- Three-fourths of all affected bars and restaurants have experienced a decline in patronage averaging 30 percent, and almost 80 percent of businesses claim to have been negatively affected by the bans.

- Bars and nightclubs that do not offer food reported a reduction in alcohol sales approaching 20 percent.

But the City and Mayor remain upbeat about the consequences of the ban. One year after the ban went into place, four City departments released a joint report[4] asserting that:

- Business tax receipts in bars and restaurants had grown almost 9 percent.
- An additional 10,600 jobs had been created in these establishments.
- 150,000 fewer New Yorkers were exposed to second-hand smoke on the job.

Each of these analyses has been subjected to criticism from the opposition, generally either because it is overly anecdotal or overly aggregated.

The Status of the Bar and Restaurant Industries in New York

Historically, the financial performance of eating and drinking establishments has tended to track the overall economy, as economic growth creates disposable income which is spent at New York's bars and restaurants. However, the recent past has seen a deviation from the long-term trend, as bars have reduced payrolls more sharply in the last two years than restaurants and the overall economy.

In terms of structure, bars and restaurants are somewhat different, as bars tend to employ far fewer people per establishment. As Figure 1 indicates, nearly 75% of all bars employ less than 5 people, while the comparable figure for restaurants is 41%. Overall, average bar employment across New York is 5 workers, while restaurants average over 15 employees per establishment statewide. Within the alcoholic beverage sector, bars and restaurants account for a rising share of liquor licenses, with the vast majority of those licenses authorizing the sale of beer, wine, and liquor. See Figures 2 and 3 for more details.

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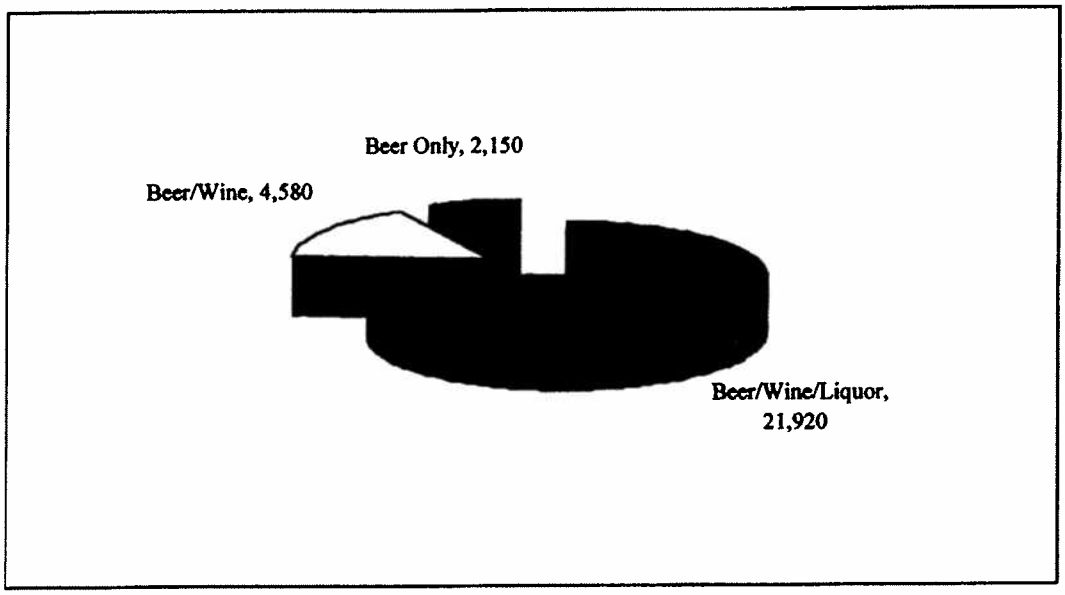
[4] "The State of Smoke-Free New York City: A One-Year Review," New York City department of Finance, New York City Department of Health & Mental Hygiene, New York City Department of Small Business Services, New York City Economic Development Corporation, March 2004.

Figure 1: Distribution of New York Establishments by Number of Employees (2001)

Figure 2: 2004 Bar and Restaurant Share of Total New York state Liquor licenses

Figure3: 2004 Distribution of New York Bar and Restaurant Liquor Licenses by Type



Source: New York State Liquor Authority

THE IMPACT OF NON-SMOKING ORDINANCES ON RESTAURANT FINANCIAL PERFORMANCE

PREPARED FOR

THE NATIONAL RESTAURANT ASSOCIATION

BY

Deloitte & Touche LLP
Washington, D.C.

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EXECUTIVE SUMMARY

- This report describes the findings of a statistical study of the impact of local government non-smoking ordinances on the sales and profits of individual tableservice restaurants. The analysis uses data from national samples of restaurants collected for five years during the 1990 to 2000 period, as well as information on the features of the ordinances applicable to the restaurants and the economic and demographic characteristics of the communities where the restaurants were located.

- Non-smoking ordinances were found to have a statistically significant impact on the sales and profits of individual restaurants in certain cases. Most of the significant effects regarding specific ordinance types enacted at different times were negative, although some positive effects were also significant.

- A temporary negative impact on restaurant sales was found in cases where 100 percent smoking bans (excluding the bar area) were in effect at the county level. The estimated declines in annual sales ranged from roughly 49 to 55 percent at restaurants where such bans were enacted two to three years prior to the survey.

- Restaurant sales also declined in areas where 100 percent smoking bans (excluding the bar area) had been enacted at the place level. Annual sales declines were estimated at 36 percent at restaurants where these bans were enacted four or more years earlier.

- In cases where significant declines in sales were estimated, gross profit tended to decline by a somewhat greater percentage.

- A positive impact on total restaurant sales and gross profit was found in cases where place-level ordinances reserved the majority of seating for nonsmokers but allowed some smoking. In cases where these ordinances were enacted two to three years before the survey, sales were estimated to increase 36 percent and gross profit was up 37 percent. In cases where these ordinances went into effect four or more years ago, sales were up 43 percent and gross profit increased 42 percent.

I. Introduction[1]

In recent years, many town, county, and state governments in the United States have enacted ordinances that limit smoking in restaurants. These laws impose varying degrees of restriction, from specifying that a small portion of restaurant seating must be reserved for nonsmokers to banning completely any smoking in a restaurant or bar.

As these measures have been debated, restaurant owners have become concerned that their business could be disrupted by further enactment of these laws. For example, under a complete ban, smokers might reduce eating in restaurants, or, if the ban applies only to a small geographic area, smokers could switch their patronage to restaurants in a neighboring jurisdiction where smoking is allowed. On the other hand, this impact could be offset by additional restaurant business from nonsmokers attracted to the smoke-free environment.

In the belief that additional research is needed to examine the issue of whether non-smoking ordinances affect the financial performance of individual restaurants, the National Restaurant Association engaged Deloitte & Touche LLP to conduct a study of this issue using a unique data set that contains a variety of financial and other information for thousands of restaurant establishments. The objective of this study is to test whether past enactments of non-smoking laws have had measurable effects on their sales and profits.

Although this report does not contain a review of the previous literature on this subject, a recent summary of such studies indicates that previous researchers have had a different focus than that of this study.[2] Previous work has tended to examine whether *aggregate* restaurant sales in a community enacting a non-smoking ordinance were affected.

On the other hand, the Association was interested in a somewhat different question – does the enactment of these ordinances have any effect on any individual restaurants, specifically, tableservice restaurants? It is possible that some individual tableservice restaurants could be affected by an ordinance at the same time that aggregate sales are unaffected.[3] For example, some types of restaurants may benefit while others are harmed, or new restaurants may gain sales while certain existing restaurants are adversely affected. In addition, the Association was interested in the possible impact on profits, as well as sales, and in possible differential impacts on food and beverage sales.

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[1] This report was written by Jon Hakken, Ph.D. and Randall Weiss, Ph.D. of the National Tax Office, Deloitte & Touche LLP, Washington, D.C. Research assistance was provided by Waleed Ziad and by the staff of the National Restaurant Association.

[2] Michelle Scollo and Anita Lal, *Summary of Studies Assessing the Economic Impact of Smoke-Free Policies in the Hospitality Industry*, VicHealth Centre for Tobacco Control, Carlton, Vic, Australia, August, 2002. (available at http://www.vctc.org.au/tc-res/hospitalitysummary.pdf)

[3] Tableservice restaurants are those that provide waitstaff to bring food to the table, in contrast to quickservice (fast food) restaurants and cafeterias.

The remainder of this report describes our statistical analysis of this issue. Using regression analysis of data on individual restaurants, we estimate the impact of non-smoking ordinances on restaurant sales and profits, controlling for a variety of restaurant and community economic and demographic characteristics that could affect these measures. Our restaurant data come from annual operations surveys that have been conducted by Deloitte for the Association for many years. (These surveys of restaurant establishments are the basis for annual reports presenting operating ratios and other statistical information on the restaurant industry.[4]) We used the zip code of each restaurant to link its data to information published by the American Nonsmokers' Rights Foundation on the non-smoking ordinances applying to that geographic area and to information on community demographic and economic characteristics that could affect restaurant sales and profits. Our statistical analysis indicates that, in some cases, sales and profits of restaurants are systematically affected, both positively and negatively, by the enactment of non-smoking ordinances.

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[4] See, for example, National Restaurant Association and Deloitte & Touche, *Restaurant Industry Operations Report,* 2001 edition.

II. Non-smoking Ordinances and Restaurant Competition

As of March 2002, at least 32 states and more than 900 localities had ordinances that regulate smoking in restaurants. Four states (California, Utah, Vermont, and Maine) and nearly 400 localities (about 250 of which were outside of California) had ordinances that ban smoking in the main dining area, although some of these ordinances allowed smoking in bar areas and outside patios or in separately ventilated rooms. Many of the ordinances that regulate smoking in restaurants also regulate smoking in public or private workplaces. These broad ordinances may or may not have special rules applicable to restaurants. Other local non-smoking ordinances are applicable only to restaurants.

Non-smoking ordinances can be adopted only by government entities that have the legal authority to do so. In most states, only counties and incorporated cities have been granted such powers by the state. Minor civil divisions in New England and in a few other states also have been granted such powers.

At the state level, there are two kinds of non-smoking ordinances: those that preempt local ordinances and those that set "minimum standards" but allow localities the option of adopting stricter standards. At the county and city levels, there are also two kinds of smoking ordinances: those that conform to the state ordinance and those that are stricter than the state ordinance by local option.

In theory, a restaurant may be subject to multiple non-smoking ordinances imposed by the city, the county, and the state in which it operates. In cases where multiple overlapping jurisdictions have adopted ordinances, one ordinance may take precedence over the other ordinances, but that is not always the case. Where the state ordinance has preempted local ordinances, the state ordinance takes precedence. Where the state ordinance sets a minimum standard, the local ordinance takes precedence whenever it is stricter. Where a city and a county both have ordinances, there is no general rule governing precedence. Depending on the state, a restaurant located within a city may not be subject to the county ordinance at all, or it may be subject to the county ordinance only if the city does not have an ordinance, or it may depend on which agency is responsible for enforcing the ordinance. The restaurant may be subject to the county ordinance in cases where the ordinance is enforced by the county health department, but not where the ordinance is enforced by the county police department.

Most non-smoking ordinances include an enforcement mechanism. Typically, responsibility for enforcement goes to either the health department, the police department, or to the city or county manager. Since voluntary compliance with non-smoking ordinances is generally good, the enforcement mechanism may not have a significant influence on the degree of compliance.

Because spending on restaurant meals by consumers is largely discretionary, tableservice restaurants have to attract customers who would otherwise eat at home or at quickservice restaurants by providing customers with a pleasurable dining experience.

Moreover, each tableservice restaurant competes with other such restaurants for the pool of customers that patronize these restaurants. Some customers enjoy smoking during or after their meals, while other customers dislike breathing second-hand smoke. In order to be successful and remain in business, each restaurant must manage its restaurant to accommodate the preferences of all of its customers to the greatest extent possible.

In localities without a restrictive non-smoking ordinance, restaurants are largely free to manage air quality for their customers. When customers who do not smoke want to avoid customers who do, restaurants have an incentive to carefully manage air quality in order to provide both smokers and non-smokers with a pleasurable dining experience. Toward that end, many restaurants have voluntarily adopted measures to satisfy customers' demands. For example, some restaurants have restricted smoking to bar or patio areas and have encouraged smokers to dine there, while other restaurants have built separately ventilated dining areas expressly for smokers or have banned smoking throughout the facility. In such cases, these measures were undertaken, without legal requirement, to attract customers to the restaurant and to position it in the marketplace to effectively compete against other restaurants.

In contrast, in localities that have adopted restrictive non-smoking ordinances that either ban or severely limit smoking in restaurants, the restaurants' arrangements for smokers and non-smokers no longer serve as a significant dimension of competition under these restaurants' control. The result of this loss of control on affected restaurants is not theoretically predictable. Restaurants that allowed smoking before the ordinance may lose some smoking customers, but also may gain some non-smoking customers. Restaurants that did not allow smoking may lose non-smoking customers to restaurants that formerly allowed smoking. Thus, regardless of whether total restaurant sales in the locality increase or decrease in response to the ordinance, the patronage of each restaurant is likely to change. Some restaurants may decide to reposition themselves in the marketplace and may have to incur additional costs to do so. The data we use in this study do not allow identification of such costs, but our findings that revenue and gross profit may be affected by non-smoking ordinances suggest that additional costs may be another impact of such ordinances.

III. Methodology

In order to estimate the impact of non-smoking ordinances on the financial performance of individual restaurants, we use a model of the form:

$$Q = f(X,Y,L) + e$$

where Q is the annual sales or profits of a restaurant, X is a vector of economic and demographic measures (income per capita, population, and employment) relating to the geographic location of the restaurant, Y is a vector of characteristics of the restaurant (total seats, bar seats, alcohol service, and operating hours), L are variables relating to the non-smoking laws affecting the restaurant, and e is a random error term.

In our analysis, the coefficients of L are the major focus of interest; X and Y are included as controls to minimize the possibility of attributing to non-smoking ordinances any impact of other factors systematically affecting restaurant performance. The specification of the variables in the L vector is difficult because of the lack of a reasonable theoretical basis for developing expectations as to the sign of the impact of these ordinances. We expect that part of the impact of such ordinances is that various groups of customers could change their total purchases of restaurant meals in opposite directions in response to the ordinances. For example, after the enactment of a non-smoking ordinance, smokers could reduce their patronage of tableservice restaurants as a group, and nonsmokers could increase their patronage. Another part of the impact could result from the limited geographic applicability of the ordinances. Thus, ordinances could have an impact on restaurants directly subject to them by shifting customers from one jurisdiction to another that has different legal restrictions in place.

Additional complications in specifying the model's inclusion of the ordinances relate to timing effects, overlap of legal jurisdiction, and the ordinances' degree of restrictiveness. First, how recently an ordinance has become effective should affect its impact on a restaurant. In general, we would expect that any impact that ordinances may have would diminish over time. For example, if a restaurant experienced a negative effect of a non-smoking ordinance because it relied heavily on smokers, the owner would be likely to undertake changes in menu, appearance, or ambiance that would attract a different clientele rather than accept permanently reduced sales or profit. Conversely, if a non-smoking ordinance initially improved a restaurant's sales or profit because it attracted increased patronage from non-smokers, we would expect that benefit to decline over time as other restaurants intensified their efforts to compete for these customers' business. In addition, customers may take time to learn about and adjust to the changes in the dining experience at affected restaurants. For these reasons, we have incorporated the time of an ordinance's enactment into our specification of the L variables.

Second, in order to incorporate the ordinances into a statistical model, certain of their most salient characteristics must be defined and categorized. The ordinances often are complex, with elaborate provisions governing such issues as appropriate ventilation

systems and enforcement procedures. As discussed in more detail in the next section, we focus on (1) the percentage of seats required to be reserved for non-smokers and (2) whether a smoking ban imposed by an ordinance applies to a restaurant's bar area.

Finally, overlap of legal jurisdiction raises additional issues. Generally, states, counties, and various units of local government have the legal authority to enact non-smoking ordinances. The distribution of such authority, however, may vary substantially from state to state. With respect to a given restaurant, the governmental structure in some states dictates that only one sub-state level of government (e.g., the county) has the authority to enact non-smoking ordinances. In others, both the county and the city or town may enact such ordinances. And, of course, state governments have enacted statewide ordinances in a few states. In addition to imposing significant data issues, this complicates the timing issue described above. For example, suppose a county enacts a non-smoking ordinance and then, two years later, a town within that county enacts a more restrictive ordinance. It is reasonable to expect that the impact of the town ordinance on a restaurant located there is affected by the existence of the prior county ordinance that also applied to the restaurant.

We present the detailed specification of our regression analysis in section IV below after we describe the data available to us.

IV. Data Sources

The data we used for the economic analysis of the impact of smoking ordinances on tableservice restaurants came from: (1) the Restaurant Operations Surveys performed by Deloitte for the National Restaurant Association, (2) the Local Tobacco Control Ordinance Database compiled by the American Nonsmokers' Rights Foundation, and (3) Regional Economic Profile data compiled by the Bureau of Economic Analysis of the U.S. Department of Commerce. Each of these data sources is described below.

Restaurant Operations Surveys

The Restaurant Industry Practice of Deloitte has compiled detailed financial and operational information on restaurants for the Association for more than a decade.[5] The information has been collected annually from a national sample of Association member restaurants, and includes such items as sales, costs, pretax profits, location (by zip code), and restaurant characteristics. Individual establishments are the unit of the survey; the data for each individual unit is what is reported in the survey even in cases where two or more units are under common ownership. The survey includes a different sample of restaurants every year. In most years, financial information on each restaurant was collected for both the survey year and the prior year.

Three surveys of restaurant operations were available for the analysis, which collectively provided annual financial results for restaurant operations during 5 separate years. The survey conducted during 2001 provided annual results for 2000 and 1999. The survey conducted during 1998 provided annual results for 1997 and 1996. The survey conducted during 1992 provided results for 1991 only. Because our analysis of the impact of smoking ordinances was concerned only with tableservice restaurants, we eliminated data on other types of restaurants (such as quickservice restaurants, cafeterias, and caterers).

Local Tobacco Control Database

The American Nonsmokers' Rights ("ANR") Foundation has compiled detailed information about state and local nonsmoking ordinances in its Local Tobacco Control Ordinance Database ("ANR database") for more than a decade. Among other information, the ANR database includes details on the restrictions and exemptions applying to restaurants under each ordinance as well as the locality and enactment date of the ordinance. In recent years, the National Association of County and City Health Officials and the National Association of Local Boards of Health have helped to improve the coverage of the database.

Information from the ANR database is readily available to the public from two sources. The first source is a list of all of the local smoking ordinances in the database as of June

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[5] The results of the survey are summarized in annual reports prepared jointly by the National Restaurant Association and Deloitte. See, for example, *Restaurant Industry Operations Report 2001.*

30, 1998; this list was published as a chapter in a National Cancer Institute monograph.[6] The list includes about 750 city and county smoking ordinances affecting restaurants, with the largest number of such ordinances in California, Massachusetts, and Texas. For each ordinance, the list identifies: (1) the year the current ordinance was adopted, (2) whether the current ordinance amended a prior ordinance, (3) the minimum required share of seats for no-smoking sections, and (4) whether the ordinance applies to the bar area of a restaurant.

The second source of information is the ANR web site, which includes a list of cities and counties that have banned restaurant smoking.[7] We used lists of smoking bans in effect as of July, 2002 and as of March, 2003 to supplement the ordinance information contained in the monograph. The lists also identify four states that banned smoking in restaurants: Vermont in 1993, California and Utah in 1994, and Maine in 1999.

It should be noted that although these sources provide information about both county and place (e.g., city or town) ordinances, they do not provide information on which level of government has the authority to impose a non-smoking ordinance where jurisdictions overlap. In a number of instances, these sources list an ordinance both for a county as well as a place within the same county, but we are unable to determine from these sources which ordinance may apply (especially if the county ordinance was enacted later than the place ordinance) or whether the county ordinance applies to incorporated cities or towns that have not enacted their own ordinances.

Characterizing the Severity of the Local Smoking Ordinance

In order to perform meaningful statistical analysis of the impact of smoking ordinances on restaurant financial performance, we developed a categorization of ordinances based on the magnitude of the change in consumer and restaurant behavior that they were likely to cause. We defined three categories based on the extent that an ordinance required seating in restaurants and attached bars to be reserved for non-smokers:

- The first category includes ordinances that require that between 50 and 99 percent of seating must be reserved for non-smokers.
- The second category includes ordinances that require reserving all of the seating in the dining area for non-smokers, but do not totally exclude smokers from the bar area of a restaurant.
- The third category includes ordinances that reserve all of the seating in the dining area for non-smokers and that apply to the bar area as well.

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[6] "State Laws and Local Ordinances to Reduce Tobacco Use" in *State and Local Legislative Action to Reduce Tobacco Use,* Smoking and Tobacco Control Monograph No. 11, U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute, NIH Pub. No. 00-4804, August 2000.

[7] The web site of the ANR Foundation is www.no-smoke.org.

We treated ordinances requiring that less than 50 percent of seating must be reserved for non-smokers as imposing no restrictions. It should be noted that although some ordinances provide exceptions for outdoor dining areas, separately ventilated rooms, and private banquet facilities, these exceptions were not taken into account in our categorization because this information was not available in the sources that we used for information on smoking ordinances.

Regional Economic Profile Data

The Bureau of Economic Analysis at the U.S. Department of Commerce compiles county-level economic and demographic data and makes the data available to the public via its web site.[8] The CA-30 Regional Economic Profiles from the Detailed County Annual Tables provide annual time-series data on county population (by place of residence), county per capita personal income (by place of residence), and county total full-time and part-time employment (by place of employment). We used this information to control for the impact of local economic conditions on the financial performance of the sampled restaurants.

Matching Surveyed Restaurants to Local Smoking Ordinances and Economic Data

In order to analyze the impact of local smoking ordinances on the financial results of the restaurants included in the restaurant operations surveys and to control for the impact of local economic conditions, the characteristics of the smoking ordinance and economic conditions in the locality where each restaurant operates were identified and matched to the restaurant. The matching was done based on the zip code of each restaurant.

Zip code areas, defined by the U.S. Postal Service, do not necessarily coincide with the jurisdictions of local governments, the entities (below the state level) that have the power to enact non-smoking ordinances. Most zip codes have a common name that may not accurately reflect whether an area is contained in a legally incorporated territory. For example, the designated common name of zip code may be the name of an unincorporated area. Also, a single zip code area may cover an area that is partly within the boundaries of an incorporated territory and partly outside of them. Because the common name associated with a zip code does not indicate reliably whether a zip code is located within the boundaries of a particular incorporated territory, we used a classification system developed by the Bureau of the Census – Zip Code Defined Area (ZCDA) – for the purpose of matching restaurants and ordinances.

The Census Bureau has defined ZCDAs to closely approximate the Postal Service's zip code areas using census block-level data. ZCDAs can be mapped to other Census-defined localities, such as counties and places, using the MABLE/Geocorr geographic

[8] The BEA web site for regional data is www.bea.gov/bea/regional/reis.

correspondence engine.[9] The Census Bureau defines a "place" as a concentration of population that has a unique identity. Under the Census definition, a place can be either a legally incorporated territory (e.g., a city or town) or an unincorporated area that the Census Bureau treats as a Census Designated Place ("CDP"). CDPs are not legally incorporated and thus lack the authority to enact smoking ordinances unless they have been granted such authority by their state as a minor civil division.

For each zip code that includes a restaurant for which we have data, the correspondence engine was used to determine the county and place, if any, of the zip code. Where the zip code spanned multiple counties, the correspondence engine identified all of the counties contained in the zip code and the share of the population in each county. Where the zip code spanned several areas designated as different places and non-place areas, the correspondence engine identified all of the areas and the share of the population in each area. The zip code was assigned to the county and the place (or area without a defined place) that had the largest share of the zip code's population.

The next step in the matching process was to determine whether either the county or place to which the zip code was assigned has a smoking ordinance. (In most states, only counties and those cities and towns that are incorporated as legal entities within the state have the authority to enact smoking ordinances. However, in New England, New York, Wisconsin, and Hawaii, some minor civil divisions may have the power to enact smoking ordinances.) The names of the county and place were checked against the list of local smoking ordinances and bans. In states where minor civil divisions have authority to enact ordinances, the name of the CDP was also checked against the lists. If the county or place had an ordinance, information about the ordinance from the ANR lists was associated with the zip code. If the county and place both had ordinances, information about both ordinances was associated with the zip code.

For the few zip codes where the lists of smoking bans in 2002 and 2003 indicated that a ban had gone into effect since the original ordinance list had been compiled, we researched the local smoking ban to determine the year when it was enacted.

The final step was to match the restaurant data with the economic and demographic data described above, based on the zip code of each surveyed restaurant.

As a result of this data merging process, the information for each restaurant in our data set included three sets of variables: (1) the restaurant characteristics and financial information available from the Operations Survey, (2) the information about smoking ordinances in effect in the state, county, and locality in which the restaurant was located, and (3) the economic and demographic variables in the county in which the restaurant was located.

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[9] A version of the geographic correspondence engine can be found at http://mcdc2.missouri.edu/websas/geocorr2k.html.

V. Estimation Strategy, Definition of Variables, and Screening Criteria

We developed an estimation strategy that reflected the major question we were investigating, the lack of a well-developed theory of the impact of non-smoking ordinances, and the limitations of our data. Our major question was, "What, if any, effects do non-smoking ordinances have on the financial performance of individual tableservice restaurants?" Without a well-developed theory of when and how such ordinances might affect restaurants and their customers, we pursue a reduced-form approach in specifying our regression analysis. That is, we convert the available information on the ordinances into a series of dummy variables, allowing for extensive interactions among ordinance characteristics, to enhance the flexibility of the specification.

This decision is also consistent with the limitations of the ordinance data available to us. As described above, we know only a few features of these ordinances, and we lack information on their exact geographic applicability. Further, we are unable to properly account for the influence on a restaurant of the laws in neighboring jurisdictions (which may be more or less conducive to the smokers who may otherwise patronize a restaurant directly affected by the ordinance on which we do have information). Our information on the time the ordinance has been in effect is imprecise, since we have only the year of the ordinance's enactment, not the date it became effective. Finally, we use ordinance information (such as whether the ordinance was amended) that may not have a clear theoretical effect but may in some way indicate the extent of its impact on restaurants.

We adopted the same flexible approach with respect to the specification of the impact of control variables, since we are not focusing on estimates of their precise impact. For example, we believed that both population and population growth in the county in which a restaurant was located could affect its financial performance. Rather than constraining the impact of these variables, however, we simply include in the equation the population level for the current and prior two years to allow maximum specification flexibility. Similarly, since we are pooling data for five different years, we included in our equation dummy variables for four of the five years to capture inflation as well as any other economy-wide influences on restaurants' financial performance.[10] Although we could have attempted to use real levels of restaurant sales and profits measures as our dependent variables in order to distinguish between these two influences, we simply entered dummy variables to capture the combination of both of these factors.

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[10] A dummy variable is defined to have a value of 1 if an observation includes a specific characteristic and a value of 0 in all other cases. For example, if the financial data for an individual restaurant observation pertained to 1997, the 1997 dummy variable was set equal to 1. If the data pertained to any other year, the 1997 dummy variable was set equal to 0.

The variables for each restaurant were keyed to the year to which the restaurant's financial data applies. For example, if an observation used 1997 financial data for a restaurant, then the ordinance variables were defined using 1997 as the current year and the community characteristics were defined as of 1997.

We defined a number of dummy variables to represent various combinations of features of the non-smoking ordinances that applied to the restaurants. As explained above, we used an approach of allowing many interactions because of the uncertainty about the direction and structure of the ordinance's impact. The specific dummy variables were as follows:

Three *county* ordinance categories (see above) reflecting the severity of the ordinance in effect in the current year, interacted with three categories of time elapsed between current year and year of ordinance enactment (0-1 years, 2-3 years, or 4 or more years) (9 dummy variables)

Three *place* ordinance categories (see above) reflecting the severity of the ordinance in effect in the current year, interacted with three categories of time elapsed between current year and year of ordinance enactment (0-1 years, 2-3 years, or 4 or more years) (9 dummy variables)

Amended *county* ordinance interacted with the two most severe ordinance types and the three time periods (6 dummy variables)

Amended *place* ordinance interacted with the two most severe ordinance types and the three time periods (6 dummy variables)

Place and county ordinance interaction dummy variables – if both the county and place where the restaurant is located have ordinances and (1) the county ordinance was enacted earlier, or (2) the place ordinance was enacted earlier and is less restrictive than the county ordinance, or (3) the place ordinance was enacted earlier and is equally or more restrictive than the county ordinance (3 dummy variables)

The other variables we used in the equations were defined as follows:

Community characteristics

County employment (current year and the two prior years)
County population (current year and the two prior years)
Real income per capita (current year and the two prior years; deflated using Consumer Price Index with 1989 as base year)

Year of financial data

1996 (dummy variable)

1997 (dummy variable)
1999 (dummy variable)
2000 (dummy variable)

Restaurant Characteristics (current year)

Dependent variables

Gross food revenue (log)
Gross alcohol beverages revenue (log)
Gross total revenue (log)
Gross profit (log)

Independent variables

Number of bar seats as percent of total seats
Number of total seats (log)
Breakfast served (dummy variable)
Dinner served (dummy variable)
Open 24 hours per day (dummy variable)
Alcohol served (dummy variable) – (reports beer, wine, full liquor service, or gross beverage revenue)

A number of observations were deleted from the sample before any statistical estimation was performed. First, clubs were deleted, since they often are treated differently under non-smoking ordinances than restaurants open to the public. Second, restaurants subject in the year of the financial data to a statewide non-smoking ordinance mandating a complete ban on smoking in restaurants (the most restrictive category of ordinance we defined) were deleted. Statewide bans cover a much larger area than the county and place bans, and we were not confident that our community characteristic control variance would adequately capture factors unique to an entire state that may affect restaurant sales and profits. Third, in order to eliminate very large or very small or part-year restaurants, establishments with total revenue greater than $10 million or more than 1500 seats were deleted, as were restaurants with revenue less than $50,000. Further, in regressions using beverage sales and food sales as dependent variables, restaurants were deleted if the values of the dependent variable were less than $5,000 or $50,000, respectively. Fourth, in order to eliminate restaurants in which the bar area was dominant, establishments with bar seats comprising more than 60 percent of total seats were deleted. Finally, restaurants with missing values for the independent variables described above were deleted; in individual regressions, observations with missing values of the dependent variable were also screened out.

Table 1: Number of Restaurants, by Year of Financial Data and Type of Ordinance Applicable in that Year

Year of Financial Data	Total Number of Restaurants	Type of Ordinance Applicable: 100 Percent Non-Smoking	Type of Ordinance Applicable: 50 – 100 Percent Non-Smoking, Bar Exempt	Type of Ordinance Applicable: Less Restrictive or No Ordinance
1991	1266	2	56	1208
1996	569	10	32	527
1997	575	14	36	525
1999	367	10	31	326
2000	368	9	32	327
Total	3145	45	187	2913

Table 1 contains descriptive information on our sample after the eliminations described in the previous paragraph. Table 1 indicates that 1991 is year with the largest number of restaurants. In this year, hardly any of the restaurants were subject to the most severe category of non-smoking ordinance. In later years, a higher percentage of restaurants became subject to this category of ordinances, as well as the three categories as a group. Overall, about 7 percent of the sample was subject to a non-smoking ordinance in the year for which financial information was reported.

Geographically, the surveyed restaurants in the combined sample span 48 states (all except Colorado and Connecticut) and the District of Columbia. The two states with the largest number of restaurants included in the combined sample are Texas and Ohio.

VI. Results of the Regression Analysis

We estimated regression equations using each of the four dependent variables listed above. The complete regression results are presented in Appendix A; a table of means, standard deviations, and ranges of the variables is in Appendix B. This section contains an overview of the most significant findings.[11]

For each equation, we first tested the hypothesis that all of the coefficients of the ordinance dummy variables are jointly zero, i.e., that non-smoking ordinances have no effect on restaurant sales and profits. The results of these tests are shown in Table 2. For each equation, this hypothesis is rejected with a low level of significance.[12] Thus, our data provides strong evidence that these ordinances do affect restaurant financial performance.

Table 2: Significance level of tests that ordinance variables are jointly zero

Dependent Variable	F-statistic (degrees of freedom)	Significance Level
Beverage sales	1.66 (28,2338)	0.0162
Food sales	1.68 (28,3087)	0.0143
Total sales	1.76 (28,3097)	0.0083
Gross profit	1.73 (28,3097)	0.0103

Table 3 presents estimates of the impact of non-smoking ordinances on restaurant sales and profits. This table was constructed in several steps. First, from the regression results in Appendix A, we identified the cases in which any of the nine ordinance dummy variables for county ordinances or the nine dummy variables for place ordinances are significantly different from zero at the 10 percent level and entered the coefficient into the table. Second, where none of the 12 dummy variables associated with the two most restrictive ordinance types is significant in an equation in Appendix A, we tested whether the sum of the dummy variable plus the corresponding coefficient associated with an amended ordinance was significant. If so, we entered the sum of these two coefficients into Table 3. Finally, taking account of the log-linear form of the

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[11] Regression analysis is a statistical technique that provides an quantitative estimate of the impact of a change in the value of one variable in the equation, holding constant the values of all the other variables, on the dependent variable in the equation.

[12] The significance level is an estimate of the probability that the tested hypothesis actually is true in spite of the information provided by the (necessarily) limited sample. For example, there is a 1.62 percent probability that all of the coefficients of the ordinance dummy variables in the beverage sales equation actually are equal to zero, i.e., that the ordinances have no systematic effect on beverage sales.

equations, we converted these coefficients into estimated percentage changes of the ordinance on the dependent variable. The table distinguishes between the 5 and 10 percent levels of significance, and indicates cases in which a significant result applies only to an amended ordinance. Thus, for example, in our beverage sales equation, the coefficient of the dummy variable for a county non-smoking ordinance that (1) reserves all seats for non-smokers but does not apply to the bar and (2) was enacted two to three years before the year for which we measure financial performance, is -1.081. This estimate is significantly different from zero at a 5 percent level of significance. Converting this estimate into percentage terms, a restaurant subject to such an ordinance is estimated to have beverage sales 66.1 percent lower than a restaurant not subject to any of the three categories of ordinances; this is the figure that appears in the table.

Table 3: Estimates of Impact of Anti-Smoking Ordinances on Restaurant Sales and Profits

Percentage Change In Sales and Profit Measures

Ordinance Geographic Area	County									Place								
Nature of Ordinance	50-99% non-smoking			100% non-smoking except bar			100% non-smoking			50-99% non-smoking			100% non-smoking except bar			100% non-smoking		
Years Since Enactment	0-1	2-3	4+	0-1	2-3	4+	0-1	2-3	4+	0-1	2-3	4+	0-1	2-3	4+	0-1	2-3	4+
DEPENDENT VARIABLE																		
Beverage Sales					**-66.1%**		-66.0%	-45.2%				**73.5%**			69.0%			181.2%
Food Sales					**-42.4%**		-54.7%				**43.3%**	**39.8%**			*-42.2%*			
Total Sales			-19.8%		**-49.0%**		-55.2%				**35.9%**	**42.9%**			*-35.9%*			
Gross Profit					**-51.5%**		-56.6%				**37.1%**	**41.9%**			*-42.0%*			

Estimates shown are significant at 10 percent level; bold estimates are significant at 5 percent level.
Italicized figures indicate estimate is for an amended ordinance.

The estimates in Table 3 indicate that non-smoking ordinances have impacts on restaurants in several ways. First, county 100 percent non-smoking ordinances (not applying to the bar) have an estimated negative impact on all performance measures in the period two to three years after enactment. Further, there is an indication that the most restrictive type of ordinance, which applies to the bar as well as the restaurant, has an impact in the first year or so after enactment, but the significance level of this result is not as high. The only impact of county ordinances reserving less than 100 percent of seats for non-smoking is on total restaurant sales, and only four or more years after enactment, at a lower significance level.

The estimated pattern of impact of place ordinances is somewhat different. The type of ordinance that has a significantly negative effect if enacted by the county – reserving 100 percent of seats for non-smokers (not applying to the bar)—also has an estimated significantly negative impact, but only for the period four or more years after enactment and only when the ordinance has been amended. Interestingly, place ordinances that require that less than 100 percent of seats be reserved for non-smokers actually appear improve sales and profits, presumably because the introduction of large non-smoking section attracts non-smokers to the restaurant without discouraging the patronage of smokers. Finally, the data indicate, although at the lower significance level, that the most restrictive types of ordinances actually improve beverage sales. We cannot explain why the different ordinances appear to have a positive effect on beverage sales while having a negative effect on the other financial performance measures.

It should be emphasized that these results should be interpreted with caution because the pattern of results summarized in Table 3 does not appear to reflect a systematic influence of all types of ordinances at any given time period. Further, some of the estimated effects are statistically different from zero only at a relatively high 10 percent significance level. In addition, the estimated percentage impacts of the ordinances appear to be larger in some cases than have been claimed by restaurant owners. However, the combination of the significant joint tests that all ordinance variables are not zero, as well as the substantial number of significant coefficients, indicates that local non-smoking ordinances appear to affect the financial performance of restaurants.

VII. Conclusion

This study has focused on statistical analysis of the impact of non-smoking ordinances on restaurant financial performance. Unlike a number of previous research efforts, we have used data on individual restaurants rather than aggregate restaurant sales in localities subject to these laws. We have created a unique data set, starting with surveys of individual restaurants finished well before this study began. We linked the surveys to information on the local non-smoking ordinances applicable to these particular restaurants in the years for which the survey information was collected and to contemporaneous community economic and demographic characteristics. Using regression analysis to control for other influences on restaurant sales and profits, we produced estimates of the impact of ordinance characteristics.

Our estimates indicate that non-smoking ordinances have significant effects on restaurants sales and profits. We strongly reject the hypothesis that these ordinances have no impact on individual restaurants. The majority of our statistically significant estimates of specific ordinance types enacted at different times indicate negative effects on restaurants, although we show positive effects in a few cases as well.

These estimates should be interpreted with caution, however. The estimates for county and place ordinances are somewhat inconsistent, and the estimates depend to some extent on ordinance features (such as whether the ordinance is amended) that do not have a strong intuitive connection to an ordinance's effect. In spite of these caveats, the statistical analysis appears to confirm some of the anecdotal reports that restaurants are indeed affected by the enactment of these ordinances.

APPENDIX A. REGRESSION EQUATIONS

1. Beverage Sales

Source	SS	df	MS		
Model	1048.23991	46	22.787824	Number of obs =	2385
Residual	1684.3156	2338	.720408724	F(46, 2338) =	31.63
				Prob > F =	0.0000
Total	2732.5555	2384	1.14620617	R-squared =	0.3836
				Adj R-squared =	0.3715
				Root MSE =	.84877

log Bev Sales	Coef.	Std. Err.	t	P>|t|	[90% Conf.	Interval]
County c1 0-1 yrs	.188685	.2128601	0.89	0.375	-.1615775	.5389475
County c2 0-1 yrs	.0633481	.8508455	0.07	0.941	-1.336723	1.463419
County c3 0-1 yrs	-1.077674	.6033819	-1.79	0.074	-2.070542	-.0848052
County c1 2-3 yrs	.1779771	.2718633	0.65	0.513	-.2693755	.6253297
County c2 2-3 yrs	-1.081443	.4296512	-2.52	0.012	-1.788436	-.374449
County c3 2-3 yrs	-.6008507	.3485573	-1.72	0.085	-1.174404	-.0272978
County c1 4+ yrs	-.1171638	.2221809	-0.53	0.598	-.4827637	.2484361
County c2 4+ yrs	-.5392524	.35008	-1.54	0.124	-1.115311	.0368062
County c3 4+ yrs	-.2286523	.3482588	-0.66	0.512	-.801714	.3444095
County c2 0-1 yrs amd	-.1202626	.8865163	-0.14	0.892	-1.57903	1.338505
County c3 2-3 yrs amd	.1009738	.6968418	0.14	0.885	-1.045683	1.247631
Place c1 0-1 yrs	-.2231085	.425796	-0.52	0.600	-.9237582	.4775411
Place c2 0-1 yrs	.10437	.8505894	0.12	0.902	-1.29528	1.50402
Place c3 0-1 yrs	.9764619	1.245226	0.78	0.433	-1.072565	3.025489
Place c1 2-3 yrs	-.2059153	.196336	-1.05	0.294	-.5289872	.1171567
Place c2 2-3 yrs	.5535591	.3860915	1.43	0.152	-.0817566	1.188875
Place c3 2-3 yrs	.3539598	.3487718	1.01	0.310	-.2199461	.9278657
Place c1 4+ yrs	.5510697	.1663068	3.31	0.001	.2774109	.8247285
Place c2 4+ yrs	.5247187	.2863199	1.83	0.067	.0535777	.9958597
Place c3 4+ yrs	1.024837	.6045299	1.70	0.090	.0300796	2.019594
Place c2 0-1 yrs amd	.4547984	.9201006	0.49	0.621	-1.059232	1.968829
Place c3 0-1 yrs amd	-1.522728	1.294639	-1.18	0.240	-3.653064	.6076089
Place c2 2-3 yrs amd	-.1873128	.5521247	-0.34	0.734	-1.095837	.7212115
Place c2 4+ yrs amd	-.5962483	.4006612	-1.49	0.137	-1.255539	.063042
Place c3 4+ yrs amd	-1.215555	.6668044	-1.82	0.068	-2.312786	-.1183249
Co&Pl:Place later	.3209983	.9715366	0.33	0.741	-1.277671	1.919667
Co&Pl Pl less sev.	-.2119023	.901382	-0.24	0.814	-1.695132	1.271327
Co&Pl Pl more restr.	-.4524056	.6616788	-0.68	0.494	-1.541202	.6363907
log seats	.6988054	.028308	24.69	0.000	.6522245	.7453864
Breakfast dummy var	-.5307721	.0437909	-12.12	0.000	-.6028303	-.4587139
Dinner dummy var	1.280835	.1833586	6.99	0.000	.9791179	1.582553
24 hours dummy var	.5431622	.1851206	2.93	0.003	.2385452	.8477792
% bar seats	2.406414	.1383217	17.40	0.000	2.178805	2.634023
Per Capita Inc.	-.000105	.0000462	-2.27	0.023	-.000181	-.000029
Per Capita Inc.(-1)	.0000618	.0000685	0.90	0.367	-.0000509	.0001745
Per Capita Inc.(-2)	.0000919	.0000458	2.01	0.045	.0000166	.0001673
Employment	3.53e-06	1.01e-06	3.49	0.001	1.86e-06	5.20e-06
Employment (-1)	-5.43e-06	3.00e-06	-1.81	0.071	-.0000104	-4.88e-07
Employment (-2)	2.15e-06	2.39e-06	0.90	0.370	-1.79e-06	6.08e-06
Population	6.11e-06	2.64e-06	2.32	0.021	1.77e-06	.0000104
Population (-1)	-.0000139	4.72e-06	-2.95	0.003	-.0000217	-6.16e-06
Population (-2)	7.78e-06	2.47e-06	3.14	0.002	3.71e-06	.0000119
y1996	.1579542	.0580085	2.72	0.007	.062501	.2534075
y1997	.1969096	.0631679	3.12	0.002	.0929664	.3008528
y1999	.2985394	.0731172	4.08	0.000	.1782247	.4188542
y2000	.2907073	.0681701	4.26	0.000	.178533	.4028816
Constant	5.903005	.253814	23.26	0.000	5.485353	6.320658

2. Food Sales

Source	SS	df	MS		
Model	868.433384	47	18.477306	Number of obs	= 3135
Residual	1258.49113	3087	.407674482	F(47, 3087)	= 45.32
				Prob > F	= 0.0000
Total	2126.92451	3134	.678661299	R-squared	= 0.4083
				Adj R-squared	= 0.3993
				Root MSE	= .63849

Log Food Sales	Coef.	Std. Err.	t	P>|t|	[90% Conf.	Interval]
County c1 0-1 yrs	.1683487	.1437561	1.17	0.242	-.0681801	.4048775
County c2 0-1 yrs	.7115468	.6396811	1.11	0.266	-.3409508	1.764044
County c3 0-1 yrs	-.7906035	.4534917	-1.74	0.081	-1.536755	-.0444521
County c1 2-3 yrs	.0316427	.1864736	0.17	0.865	-.2751711	.3384566
County c2 2-3 yrs	-.5506519	.2624702	-2.10	0.036	-.9825065	-.1187973
County c3 2-3 yrs	-.3479536	.2618853	-1.33	0.184	-.7788459	.0829386
County c1 4+ yrs	-.2229947	.134969	-1.65	0.099	-.4450656	-.0009238
County c2 4+ yrs	-.1333398	.2622363	-0.51	0.611	-.5648096	.29813
County c3 4+ yrs	.2058771	.26173	0.79	0.432	-.2247597	.6365139
County c2 0-1 yrs amd	-.7808308	.6634432	-1.18	0.239	-1.872425	.3107637
County c3 2-3 yrs amd	.6696102	.5236377	1.28	0.201	-.1919557	1.531176
Place c1 0-1 yrs	.0332748	.2998759	0.11	0.912	-.4601252	.5266748
Place c2 0-1 yrs	-.4072767	.639586	-0.64	0.524	-1.459618	.6450644
Place c3 0-1 yrs	.3851219	.7322073	0.53	0.599	-.8196135	1.589857
Place c1 2-3 yrs	.3595008	.1371802	2.62	0.009	.1337917	.5852099
Place c2 2-3 yrs	-.1197375	.289485	-0.41	0.679	-.5960409	.3565659
Place c3 2-3 yrs	.064675	.2267434	0.29	0.775	-.3083967	.4377466
Place c1 4+ yrs	.3351684	.1149702	2.92	0.004	.1460024	.5243344
Place c2 4+ yrs	.0475992	.214779	0.22	0.825	-.305787	.4009853
Place c3 4+ yrs	.4434344	.4538453	0.98	0.329	-.3032988	1.190168
Place c2 0-1 yrs amd	.5131632	.6875047	0.75	0.455	-.6180209	1.644347
Place c3 0-1 yrs amd	-.2237237	.771849	-0.29	0.772	-1.493683	1.046236
Place c2 2-3 yrs amd	.3481247	.4135496	0.84	0.400	-.3323082	1.028557
Place c2 4+ yrs amd	-.5959907	.2920735	-2.04	0.041	-1.076553	-.1154284
Place c3 4+ yrs amd	-.4161669	.500874	-0.83	0.406	-1.240279	.4079448
Co&Pl:Place later	.0044155	.4400342	0.01	0.992	-.7195937	.7284247
Co&Pl Pl less sev.	.2504113	.4995076	0.50	0.616	-.5714521	1.072275
Co&Pl Pl more restr.	-.8881191	.485145	-1.83	0.067	-1.686351	-.0898871
log seats	.6979451	.018148	38.46	0.000	.6680853	.727805
Breakfast dummy var	-.1397889	.0266644	-5.24	0.000	-.1836612	-.0959166
Dinner dummy var	.3283266	.0617546	5.32	0.000	.2267188	.4299344
24 hours dummy var	.7029649	.0695947	10.10	0.000	.5884575	.8174723
Alcohol dummy var	-.0901261	.0458454	-1.97	0.049	-.1655577	-.0146945
% bar seats	-.5075758	.0944733	-5.37	0.000	-.6630173	-.3521343
Per Capita Inc.	-.0000697	.0000295	-2.36	0.018	-.0001182	-.0000212
Per Capita Inc.(-1)	.0000405	.0000424	0.95	0.340	-.0000293	.0001103
Per Capita Inc.(-2)	.0000576	.000029	1.98	0.048	9.77e-06	.0001054
Employment	2.80e-06	7.02e-07	3.99	0.000	1.64e-06	3.95e-06
Employment (-1)	-4.93e-06	2.09e-06	-2.37	0.018	-8.37e-06	-1.50e-06
Employment (-2)	2.35e-06	1.67e-06	1.41	0.159	-3.96e-07	5.11e-06
Population	2.33e-06	1.84e-06	1.27	0.204	-6.88e-07	5.35e-06
Population (-1)	-2.73e-06	3.26e-06	-0.84	0.402	-8.08e-06	2.63e-06
Population (-2)	3.64e-07	1.69e-06	0.22	0.830	-2.42e-06	3.15e-06
y1996	.1955697	.0376443	5.20	0.000	.1336318	.2575076
y1997	.2372825	.0408762	5.80	0.000	.170027	.304538
y1999	.2576731	.0471718	5.46	0.000	.180059	.3352872
y2000	.2866144	.0442798	6.47	0.000	.2137587	.3594701
Constant	9.114477	.1228324	74.20	0.000	8.912375	9.316579

3. Total Sales

Source	SS	df	MS		
Model	980.059393	47	20.8523275	Number of obs =	3145
Residual	1159.24493	3097	.374312214	F(47, 3097) =	55.71
Total	2139.30432	3144	.680440306	Prob > F =	0.0000
				R-squared =	0.4581
				Adj R-squared =	0.4499
				Root MSE =	.61181

Log Total Sales	Coef.	Std. Err.	t	P>|t|	[90% Conf.	Interval]
County c1 0-1 yrs	.0622507	.1352392	0.46	0.645	-.1602646	.2847659
County c2 0-1 yrs	.6106542	.6129405	1.00	0.319	-.3978449	1.619153
County c3 0-1 yrs	-.8018065	.4345238	-1.85	0.065	-1.516748	-.0868646
County c1 2-3 yrs	.0687968	.1786713	0.39	0.700	-.2251793	.3627729
County c2 2-3 yrs	-.6732123	.2514992	-2.68	0.007	-1.087015	-.2594092
County c3 2-3 yrs	-.3902205	.250938	-1.56	0.120	-.8031003	.0226593
County c1 4+ yrs	-.220781	.1293212	-1.71	0.088	-.4335591	-.0080029
County c2 4+ yrs	-.1898329	.2512735	-0.76	0.450	-.6032648	.2235989
County c3 4+ yrs	.1671865	.2507874	0.67	0.505	-.2454455	.5798185
County c2 0-1 yrs amd	-.6691555	.6357095	-1.05	0.293	-1.715117	.3768064
County c3 2-3 yrs amd	.6141815	.5017462	1.22	0.221	-.2113644	1.439727
Place c1 0-1 yrs	.08779	.2873243	0.31	0.760	-.3849579	.5605379
Place c2 0-1 yrs	-.2876259	.6128528	-0.47	0.639	-1.295981	.7207289
Place c3 0-1 yrs	.6950867	.7015323	0.99	0.322	-.4591765	1.84935
Place c1 2-3 yrs	.3069277	.1314464	2.34	0.020	.0906529	.5232026
Place c2 2-3 yrs	.0540667	.2773727	0.19	0.845	-.4023073	.5104407
Place c3 2-3 yrs	.1671943	.2172582	0.77	0.442	-.1902706	.5246593
Place c1 4+ yrs	.3571432	.1101642	3.24	0.001	.1758849	.5384014
Place c2 4+ yrs	.162172	.2057963	0.79	0.431	-.1764341	.500778
Place c3 4+ yrs	.5335418	.4348742	1.23	0.220	-.1819767	1.24906
Place c2 0-1 yrs amd	.4670426	.658765	0.71	0.478	-.6168536	1.550939
Place c3 0-1 yrs amd	-.5749767	.7395166	-0.78	0.437	-1.791737	.6417839
Place c2 2-3 yrs amd	.2645998	.3962534	0.67	0.504	-.3873741	.9165736
Place c2 4+ yrs amd	-.6072665	.2798523	-2.17	0.030	-1.06772	-.1468126
Place c3 4+ yrs amd	-.4805591	.4799389	-1.00	0.317	-1.270225	.3091064
Co&Pl:Place later	-.1305334	.4215284	-0.31	0.757	-.8240934	.5630266
Co&Pl Pl less sev.	.1845607	.478627	0.39	0.700	-.6029463	.9720677
Co&Pl Pl more restr.	-.7387597	.4648663	-1.59	0.112	-1.503626	.0261061
log seats	.7137541	.0172572	41.36	0.000	.68536	.7421482
Breakfast dummy var	-.1927714	.0254716	-7.57	0.000	-.234681	-.1508619
Dinner dummy var	.3584225	.0588812	6.09	0.000	.2615425	.4553025
24 hours dummy var	.6440847	.06589	9.78	0.000	.5356728	.7524965
Alcohol dummy var	.0119027	.043903	0.27	0.786	-.0603329	.0841383
% bar seats	.1008116	.089902	1.12	0.262	-.0471083	.2487314
Per Capita Inc.	-.0000777	.0000282	-2.75	0.006	-.0001241	-.0000312
Per Capita Inc.(-1)	.0000382	.0000406	0.94	0.347	-.0000287	.0001051
Per Capita Inc.(-2)	.0000725	.0000278	2.61	0.009	.0000267	.0001182
Employment	2.73e-06	6.72e-07	4.07	0.000	1.63e-06	3.84e-06
Employment (-1)	-5.22e-06	2.00e-06	-2.61	0.009	-8.51e-06	-1.93e-06
Employment (-2)	2.69e-06	1.60e-06	1.68	0.094	5.13e-08	5.32e-06
Population	3.72e-06	1.76e-06	2.12	0.034	8.28e-07	6.62e-06
Population (-1)	-5.32e-06	3.12e-06	-1.71	0.088	-.0000104	-1.86e-07
Population (-2)	1.58e-06	1.62e-06	0.98	0.328	-1.08e-06	4.25e-06
y1996	.2033203	.036004	5.65	0.000	.1440812	.2625594
y1997	.2477507	.0390938	6.34	0.000	.1834279	.3120736
y1999	.2699381	.0451295	5.98	0.000	.1956845	.3441917
y2000	.2850153	.0423247	6.73	0.000	.2153765	.3546542
Constant	8.957134	.1172553	76.39	0.000	8.764208	9.150059

4. Gross Profits

Source	SS	df	MS		
Model	1035.71766	47	22.036546	Number of obs	= 3145
Residual	1312.13507	3097	.423679391	F(47, 3097)	= 52.01
Total	2347.85273	3144	.746772498	Prob > F	= 0.0000
				R-squared	= 0.4411
				Adj R-squared	= 0.4327
				Root MSE	= .65091

log Gross Profits	Coef.	Std. Err.	t	P>|t|	[90% Conf.	Interval]
County c1 0-1 yrs	.0456315	.1438813	0.32	0.751	-.191103	.2823659
County c2 0-1 yrs	.6273843	.6521087	0.96	0.336	-.44556	1.700329
County c3 0-1 yrs	-.8342026	.4622908	-1.80	0.071	-1.594831	-.0735743
County c1 2-3 yrs	.0998665	.1900888	0.53	0.599	-.2128953	.4126282
County c2 2-3 yrs	-.7243631	.2675705	-2.71	0.007	-1.164609	-.2841171
County c3 2-3 yrs	-.4030841	.2669735	-1.51	0.131	-.8423477	.0361796
County c1 4+ yrs	-.1521118	.1375851	-1.11	0.269	-.3784869	.0742633
County c2 4+ yrs	-.1868418	.2673304	-0.70	0.485	-.6266928	.2530091
County c3 4+ yrs	.1958343	.2668132	0.73	0.463	-.2431657	.6348343
County c2 0-1 yrs amd	-.7455519	.6763326	-1.10	0.270	-1.858353	.3672492
County c3 2-3 yrs amd	.5529775	.5338088	1.04	0.300	-.3253226	1.431278
Place c1 0-1 yrs	.1752821	.305685	0.57	0.566	-.3276754	.6782396
Place c2 0-1 yrs	-.2519487	.6520154	-0.39	0.699	-1.32474	.8208421
Place c3 0-1 yrs	.8176568	.7463617	1.10	0.273	-.4103662	2.04568
Place c1 2-3 yrs	.3156648	.1398461	2.26	0.024	.0855695	.54576
Place c2 2-3 yrs	.0512152	.2950974	0.17	0.862	-.4343221	.5367525
Place c3 2-3 yrs	.2224321	.2311415	0.96	0.336	-.1578756	.6027398
Place c1 4+ yrs	.3502257	.1172039	2.99	0.003	.1573847	.5430667
Place c2 4+ yrs	.192467	.2189471	0.88	0.379	-.1677767	.5527107
Place c3 4+ yrs	.590998	.4626636	1.28	0.202	-.1702436	1.35224
Place c2 0-1 yrs amd	.5068309	.7008615	0.72	0.470	-.6463286	1.65999
Place c3 0-1 yrs amd	-.6667489	.7867733	-0.85	0.397	-1.961263	.6277652
Place c2 2-3 yrs amd	.3196516	.4215748	0.76	0.448	-.3739848	1.013288
Place c2 4+ yrs amd	-.7365913	.2977355	-2.47	0.013	-1.226469	-.2467135
Place c3 4+ yrs amd	-.5793388	.5106081	-1.13	0.257	-1.419466	.260788
Co&Pl:Place later	-.2303484	.448465	-0.51	0.608	-.9682284	.5075315
Co&Pl Pl less sev.	.3460435	.5092123	0.68	0.497	-.4917868	1.183874
Co&Pl Pl more restr.	-.6589341	.4945722	-1.33	0.183	-1.472676	.1548083
log seats	.7267582	.01836	39.58	0.000	.6965497	.7569668
Breakfast dummy var	-.1846496	.0270993	-6.81	0.000	-.2292372	-.1400619
Dinner dummy var	.3457077	.0626439	5.52	0.000	.2426369	.4487786
24 hours dummy var	.6866811	.0701005	9.80	0.000	.5713415	.8020207
Alcohol dummy var	.024798	.0467085	0.53	0.596	-.0520536	.1016497
% bar seats	.0974583	.0956469	1.02	0.308	-.0599139	.2548306
Per Capita Inc.	-.0000786	.00003	-2.62	0.009	-.000128	-.0000291
Per Capita Inc.(-1)	.0000391	.0000432	0.90	0.366	-.000032	.0001103
Per Capita Inc.(-2)	.0000753	.0000296	2.54	0.011	.0000266	.000124
Employment	3.00e-06	7.15e-07	4.19	0.000	1.82e-06	4.18e-06
Employment (-1)	-5.39e-06	2.13e-06	-2.53	0.011	-8.88e-06	-1.89e-06
Employment (-2)	2.63e-06	1.70e-06	1.54	0.123	-1.77e-07	5.43e-06
Population	4.15e-06	1.87e-06	2.22	0.027	1.08e-06	7.23e-06
Population (-1)	-5.87e-06	3.32e-06	-1.77	0.077	-.0000113	-4.07e-07
Population (-2)	1.69e-06	1.72e-06	0.98	0.328	-1.15e-06	4.52e-06
y1996	.1910357	.0383048	4.99	0.000	.1280111	.2540603
y1997	.2415494	.041592	5.81	0.000	.1731162	.3099826
y1999	.2515698	.0480133	5.24	0.000	.1725713	.3305684
y2000	.2653184	.0450294	5.89	0.000	.1912295	.3394073
Constant	8.392999	.1247481	67.28	0.000	8.187745	8.598252

APPENDIX B. DESCRIPTIVE STATISTICS

Variable	Mean	Std. Dev.	Min	Max
Total sales	1448457	1185451	53975	9873058
Food sales	1186464	949988.7	53975	7858957
Beverage sales	350463	350603.8	5127	3785068
Gross Profits	962635.7	813990.1	15000	7720606
County c1 0-1 yrs	.0076312	.0870364	0	1
County c2 0-1 yrs	.0057234	.0754482	0	1
County c3 0-1 yrs	.0015898	.0398472	0	1
County c1 2-3 yrs	.0038156	.0616622	0	1
County c2 2-3 yrs	.0019078	.0436435	0	1
County c3 2-3 yrs	.0025437	.0503791	0	1
County c1 4+ yrs	.0079491	.0888169	0	1
County c2 4+ yrs	.0019078	.0436435	0	1
County c3 4+ yrs	.0019078	.0436435	0	1
County c2 0-1 yrs amd	.0054054	.0733341	0	1
County c2 2-3 yrs amd	.0019078	.0436435	0	1
County c3 2-3 yrs amd	.0006359	.0252136	0	1
County c2 4+ yrs amd	.0019078	.0436435	0	1
Place c1 0-1 yrs	.0015898	.0398472	0	1
Place c2 0-1 yrs	.0028617	.0534266	0	1
Place c3 0-1 yrs	.0031797	.0563076	0	1
Place c1 2-3 yrs	.0069952	.0833577	0	1
Place c2 2-3 yrs	.0031797	.0563076	0	1
Place c3 2-3 yrs	.0025437	.0503791	0	1
Place c1 4+ yrs	.0114467	.1063923	0	1
Place c2 4+ yrs	.0066773	.0814542	0	1
Place c3 4+ yrs	.0034976	.0590465	0	1
Place c2 0-1 yrs amd	.0025437	.0503791	0	1
Place c3 0-1 yrs amd	.0022258	.0471329	0	1
Place c2 2-3 yrs amd	.0015898	.0398472	0	1
Place c3 2-3 yrs amd	.0025437	.0503791	0	1
Place c2 4+ yrs amd	.0038156	.0616622	0	1
Place c3 4+ yrs amd	.0028617	.0534266	0	1
Co&Pl:Place later	.0019078	.0436435	0	1
Co&Pl:Pl less sev.	.0006359	.0252136	0	1
Co&Pl:Pl more sev.	.0006359	.0252136	0	1
Total Seats	228.1393	172.8646	20	1500
Breakfast dummy var	.2833068	.4506758	0	1
Dinner dummy var	.936089	.2446332	0	1
24 hours dummy var	.0476948	.2131535	0	1
Alcohol dummy var	.917965	.2744616	0	1
% bar seats	.1228565	.1309135	0	.6
Per Capita Inc.	19728.89	4931.134	8622.056	65457.17
Employment	495192.5	839114.4	766	5189821
Population	776282.5	1378377	1162	8948125
y1996	.1809221	.3850148	0	1
y1997	.1828299	.3865885	0	1
y1999	.1166932	.3211054	0	1
y2000	.1170111	.3214847	0	1

Note: This table reflects the 3145 observations used in Total Sales and Gross Profits regressions, except that means of Beverage Sales and Food Sales were computed using sample used in corresponding regressions.

RESTAURANT ASSOCIATION MARYLAND

Pre-Smoking Ban/Post-Smoking Ban Sales *at Restaurants/Bars/Nightclubs with Beer, Wine, Liquor Licenses* *

Montgomery County

Pre-Smoking Ban Sales
April 2003 through December 2003: $426,668,540 Sales / $21,333,427 Sales Tax Collected

Post-Smoking Ban Sales
April 2004 through December 2004: $426,779,020 Sales / $21,338,951 Sales Tax Collected

Difference = +$110,480 Sales (+.025%) / +$5,524 Sales Tax

Talbot County

Pre-Smoking Ban Sales
May 2003 through December 2003: $25,395,560 Sales / $1,269,778 Sales Tax Collected

Post-Smoking Ban Sales
May 2004 through December 2004: $22,489,460 Sales / $1,124,473 Sales Tax Collected

Difference = -$2,906,100 Sales (-11%) / -$145,305 Sales Tax

Note:

Montgomery County's Smoking Ban Became Partially Effective October 9, 2003
The municipalities of Rockville and Gaithersburg delayed adoption until February 1, 2004 and March 22, 2004 respectively.

Talbot County's Smoking Ban Became Effective April 3, 2004

** Data for this analysis collected from sales tax figures from the Maryland Office of the Comptroller, for Industry Code 112 (Restaurants, Bars & Nightclubs with Beer, Wine, Liquor Licenses). Restaurants without liquor licenses are largely unaffected by smoking bans.*

Montgomery County Method of Analysis:
For Montgomery County data, an April 2004 – December 2004 sales period is used because these months reflect the full adoption of the county-wide smoking ban. The Montgomery County ban became only partially effective in October 2003 because the municipalities of Rockville and Gaithersburg did not adopt the ban until February and March of 2004 respectively. The sales analysis period begins on April 1st of the month following the March 2004 full county-wide adoption to allow for a customer adjustment period to fully assimilate to the ban. The sales analysis period is compared to the same period in the previous year.

Talbot County Method of Analysis:
For Talbot County data, a May 2004 – December 2004 sales period is used because these months follow the enactment of the county-wide smoking ban. The sales analysis period begins on May 1st of the month following the April 2004 enactment to allow for a customer adjustment period to fully assimilate to the ban. The sales analysis period is compared to the same period in the previous year.

The Economic Impact of Smoking Bans in Ottawa, London, Kingston, and Kitchener, Ontario

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The Economic Impact of Smoking Bans in Ontario

Executive Summary and Conclusion

Smoking bans have been imposed upon numerous jurisdictions in Ontario over the past several years. This study analyzes the impact of these bans on sales and tax receipts at bars and pubs in Ottawa, London, Kingston, and Kitchener. The analysis for Ottawa is based on separate calculations for the main downtown area, the remaining downtown area, the West side residential area, and the East side residential area.

The results are striking. After the imposition of the smoking ban, sales at bars and pubs were 23.5% lower in Ottawa, 18.7% lower in London, 24.3% lower in Kingston, and 20.4% lower in Kitchener, than would have been the case with no smoking ban.

Statistical analysis was used to determine the economic impact of the smoking bans and generate these results. In all cases, the ratio of sales or tax receipts at bars and pubs to total retail sales in the area are a function of the smoking ban, various economic variables, and seasonal dummy variables. Data for bar and pub sales and tax receipts for these regions were obtained from the Ministry of Finance under a Freedom of Information request, as discussed below.

The economic variables that were significant include the value of the Canadian dollar relative to the U.S. dollar, the index of industrial production, and the rate of unemployment. These data were obtained from Statistics Canada and other standard sources.

Over the past decade, anti-smoking activists have prepared a series of papers purporting to show that smoking bans have no negative impact on sales at eating and drinking establishments. These papers are seriously flawed by several errors, which have been corrected in this study. Some papers measured the impact of the ban only in the month in which it was imposed; we show that the effect is phased in gradually over several months. Other papers failed to treat different types of restaurants separately and have not separated bar and pub sales; we were able to accomplish this through the FOI request. Still other papers either ignored economic variables completely or used simplistic trends; we have used a variety of economic variables and included them with the proper lag structures. As a result, our findings are statistically accurate and econometrically robust. Smoking bans materially reduce sales at bars and pubs.

1. Overview and Methodology

Smoking bans in restaurants, bars, and pubs have now been implemented in hundreds of jurisdictions in Canada and the United States. For many of these jurisdictions, studies have been undertaken to determine the economic impact of these bans – in particular, how sales have been affected. At least so far, the results have generated far more heat than light. Restaurant and bar owners are convinced that their business has suffered, while anti-smoking activists claim to be just as convinced that restaurant and bar sales have not been hurt. Even with increasingly sophisticated methodologies, it was previously not possible to reach a consensus view.

In sifting through the welter of studies, several tenets have emerged that would serve to eliminate bias in either direction. These include the following:

1. Studies should be based on statistical regression models, not surveys. Surveys can be biased depending on who is asking the question, how it is asked, and who is being questioned. For example, restaurant and bar owners who have suffered a loss of business might be much more eager to release this information to a survey-taker, while those who had no loss or even a gain in business might decline to participate in the survey. Survey participants might give one answer to someone from an anti-smoking organization and a different answer to someone from a pro-smoking organizations; government surveys presumably do not suffer from this type of bias. For these reasons, data should be taken from official government records rather than collected from survey participants.

2. Changes in sales after the imposition of a smoking ban often explain very little and cannot be used as a basis for rigorous analysis. The question is not whether sales rose or fell after the imposition of a smoking ban, but whether they rose or fell relative to what would have otherwise occurred. Thus, for example, sales might rise after the imposition of a smoking ban because the economy was moving from recession to boom; or alternatively, they might fall because of an economic downturn. The only reasonable test is to compare changes in restaurant and bar sales with changes in total retail sales, taking into account changes in the overall economic environment. That can best be accomplished using multiple regression analysis.

3. Not all smoking bans are created equal. For example, a partial smoking ban in restaurants in warm-weather climates that still permits smoking at patio tables would be expected to have a far smaller impact than a total smoking ban for all tables and seats in the establishment. Failure to distinguish among different types of smoking bans often vitiates any meaningful comparison.

4. Most other studies have assumed that the impact of a smoking ban is immediate. In some jurisdictions, that might indeed be the case. In general, however, it is more likely that the impact of the smoking ban occurs over several months, as customers decide not to patronize eating and drinking establishments where they are no longer permitted to smoke. Indeed, the negative impact of a smoking ban might be spread out over several months or even quarters as eating and drinking establishments are forced out of business and others do not reopen, hence reducing the choice for patrons. At a minimum, that assumption should be systematically tested.

5. Different types of eating and drinking establishments respond differently to smoking bans. In general, it has been found that "neighborhood eateries" are more likely to suffer a loss in sales than upscale "event style" restaurants. Also, and of particular importance to this study, bar and pub sales are more severely impacted by a smoking ban than restaurant sales. Previous studies failed to make this distinction.

All these points are specifically addressed in this study. The econometric approach has been used throughout. All equations are estimated using the ratio of sales (or taxes) to total retail sales in that jurisdiction. Overall economic indicators that are used where appropriate include the value of the Canadian dollar, the index of industrial production, and the unemployment rate. In all jurisdictions considered in this study, a total smoking ban was imposed. Most of the time, the impact of the smoking ban was phased in over several months, and the economic variables also occurred with both lagged and unlagged values.

Most of the studies purporting to estimate the economic impact of smoking bans on restaurant and bar sales have been undertaken for the U.S. However, KPMG of Canada recently undertook a study to estimate the impact of the Ottawa smoking ban. They were unable to find any impact one way or the other. According to their report, "It is very difficult to isolate any effect the smoke free by law may have had on restaurant and bar sales". Instead, they point out, declines may have been due to the decline in tourism after 9/11, the recession, the massive layoffs of high-tech workers in the West End, or other economic factors.

Taken together with other anti-smoking studies from the U.S., these represent almost a classic case of disinformation. When the economy is booming, and hence sales at bars and restaurants do not materially decline, then the smoking ban must have no effect – leaving aside what one might have thought would be the obvious fact that sales grew much less rapidly than would have otherwise been the case. However, when the economy is declining and sales at eating and drinking establishments decline at double digit rates, why then of course it must have been the economy; the smoking ban could not possibly have been the reason.

One often sees the distortion of facts where "politically correct" causes are concerned, but unlike complicated issues where a plethora of complicated forces may influence the results, there are no great mysteries here. The correct method of approach is to compare sales at bars and pubs (or restaurants, or whatever specific type of retail establishment is being studied) to total retail sales, and then determine whether this ratio is rising, stable, or decreasing **taking into account other changes in the overall economic environment**. Of course sales would rise in booms and fall in recessions, other factors being equal. The methodology of any competent study should measure the behavior of the ratio of sales to relevant economic conditions. It is never sufficient simply to look at sales and say they went up or down without considering these other factors.

2. Brief Discussion of Data and Statistical Methodology

It has long been claimed by those in the restaurant, bar, and pub business that smoking bans have a greater negative impact on sales in bars and pubs than is the case for restaurants per se. There are two major reasons for this. First, many other studies that have been undertaken to measure the economic impact of smoking bans, "restaurants" includes fast food chains, where relatively few people eat on premises but overall sales receipts are fairly large. Second, and more relevant to this particular study, restaurants, bars, and pubs have all been combined in a single category. For this study, data were obtained from the Ministry of Finance under the Freedom of Information Act for sales and tax receipts at bars and pubs separately; previous studies failed to make this distinction. The results show significant negative impacts of smoking bans on bar and pub sales for several jurisdictions within Ontario.

Specifically, we requested monthly data for sales and retail sales tax for 100 food service and drinking establishments for the City of Ottawa. This list of establishments was prepared by Geospace Research Associates (GRA), which provides the Ontario Ministry of Finance with the postal codes and street addresses of the selected establishments in Ottawa. Four separate geographical regions of Ottawa were chosen, as discussed below, all of which contained more than 10 establishments in order to insure confidentiality of data. The establishments selected all met the following criteria:

- Located in an Urban Forward Sortation Area as defined by the Canada Post Corporation.
- In business continuously at the same address since January 2000.
- Identified in city business directories or telephone directories from 2000 through 2004 as pubs, bars, taverns, lounges, roadhouses, nightclubs, or billiard halls.
- Not a national chain establishment.
- Not identified solely as a restaurant, grill, or café.
- Not a private, recreational, or service club.
- Not a Canadian legion.
- Not a sports, educational, cultural, or other institutional facility.
- Not a bingo or other gaming establishment.
- Not located in a hotel or motel.

One additional criterion was used for selection: establishments were on the Fall 2001 Brewer's Retail List of the top beer accounts in the Ottawa area. This was simply used as an additional check; all the 100 establishments chosen based on the above criteria were on the Brewer's Retail List of 300 licensees.

We requested data on both sales and tax receipts at bars and pubs. One would ordinarily expect that the tax rate – tax receipts divided by sales – would be relatively constant, showing only small fluctuations due to differences of timing and possible lags in the reporting or collection of receipts, in which case a dip one month would be followed by a surge the next month. However, that was not the case. As can be seen from the detailed data shown in Appendix A, which lists all the data used in the regression equations, the ratio of taxes to sales rate would sometimes dip suddenly, falling from (say) 8% to 5% in any given month, and then returning to 8% the following month. Ministry of Finance personnel were unable to supply any reason for these data anomalies.

Since no apparent reason for these discrepancies is readily available, we have reported the results of our regression equations for both sales and tax receipts data at bars and pubs. In most cases, the measured economic effect of the smoking ban is larger for the sales data than the tax receipts data.

The Ministry of Finance was able to supply comparable data only for the period from January 2000 through December 2003. Data for 2004 were not yet available, and the figures for 1999 and earlier years were on a completely different basis and often varied by an order of magnitude. For this reason, our study has been restricted to the four year period 2000-2003, although we would have preferred to include earlier years in our sample period. Also, since London and Kingston imposed smoking bans in mid-2003, it is quite possible that the phase-in effect extended into 2004; this hypothesis can be tested as soon as further data are available.

A variety of economic data are used in these equations. Standard sources were used for macroeconomic data: the value of the Canadian dollar relative to the U.S. dollar, the index of industrial production, and the overall unemployment rate. The patterns of these variables over the sample period are shown in Figures 1-3. These graphs show the time series for these three variables from 1999 through 2003, since some of these variables are lagged in the regr ession equations).

Figure 1. Index of Unemployment Rate

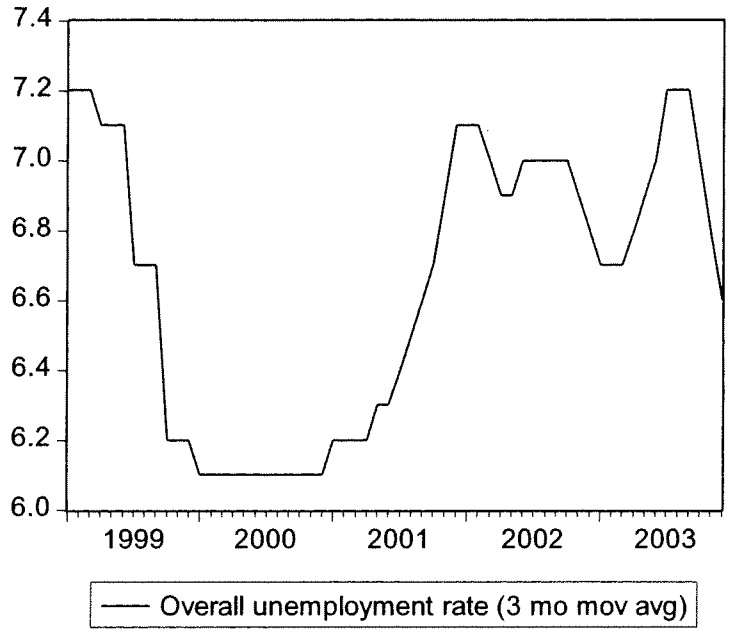
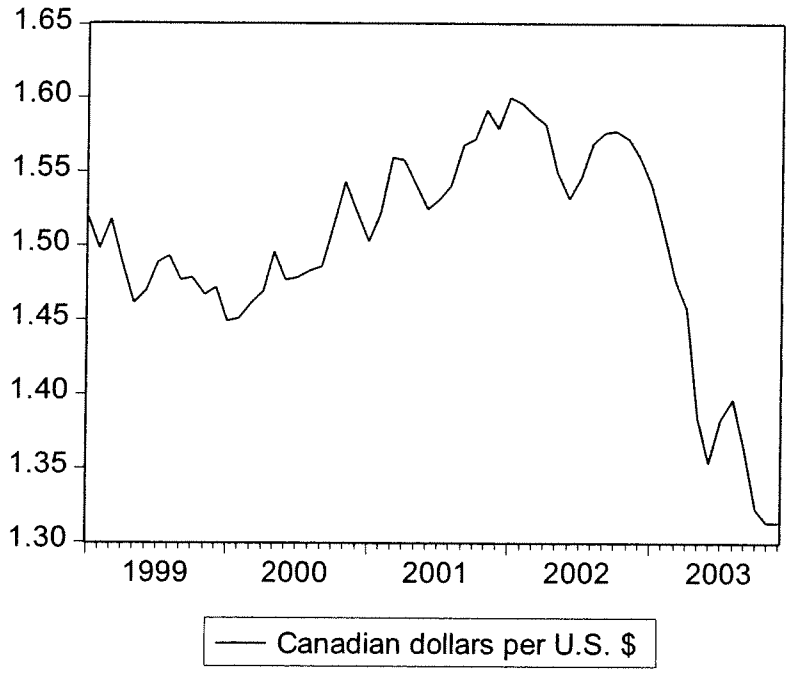


Figure 2. Index of Industrial Production

Figure 3. Value of Canadian Dollar



We also sought to obtain monthly data for total retail sales and disposable income by municipality. However, while monthly sales data were available for the province of Ontario, we were informed they were not available for individual municipalities. Hence the monthly figures for retail sales for the areas analyzed in this study were based on a combination of (a) monthly fluctuations in retail sales in Ontario, and (b) annual changes in sales for the individual areas. Similar methodology was tried for disposable income, but since the results did not provide additional information, that variable was not used in the actual regression equations.

Standard multivariate regression equations using ordinary least squares were used to calculate these results. In general, researchers run the risk that the significance levels of these results might be inflated if problems of autocorrelation and heteroscedasticity are present, and the coefficients themselves might be biased if problems of multicollinearity are present. Originally we had planned to recalculate the regression with the standard autocorrelation adjustment, but the Durbin-Watson statistic indicated that little or no autocorrelation was present in the residuals; in the few cases where it was, the results were virtually unchanged with this adjustment. Multicollinearity was generally absent because ratios were used; and most of the economic variables, such as the value of the Canadian dollar and the rate of unemployment, are also trendless. In some cases, percentage changes of the independent variables were used in order to avoid any distortions that might occur because of multicollinearity.

The issues of heteroscedasticity sometimes arose because of outlying observations for a few of the data series. There is no one particular "best" method of

treating this problem; instead, the following choices are available: omit these outliers from the sample period, use dummy variables for these outliers, or calculate the regressions for all data points without dummy variables.

No method is without its drawbacks. If dummy variables are used, the goodness-of-fit statistics are generally overstated, so some of the parameters might appear to be significant when in fact they are not. If the outliers are omitted, the resulting equations may be questioned on the grounds that the judgment of the researcher may have been skewed in the direction of excluding those points that reduced the significance levels that were being sought. Running the regressions with all observations and no dummy variable expunges the possibility of that source of bias.

In general, the question of which methodology is preferred depends on whether there is any significant partial correlation between the smoking ban dummy variables and the outlying observations. If there is not, then the elasticity estimates determined in the regression equations will not be significantly affected by the choice of equation to be estimated. We did indeed find this to be the case.

Besides calculating the partial correlation matrix, we estimated these equations in all three different ways. In virtually all cases the estimates of the elasticities were not significantly different, so those alternative regression equations are not included in the report, although they are available for inspection by interested parties.

3. Types of Regression Equations Estimated and Summary Results

In this study, the economic impact of smoking bans is examined for the following regions. The date on which the smoking ban was originally implemented is also given for each region.

Table 1. Date of Smoking Bans for Individual Regions

Region Analyzed	Date Smoking Ban Implemented
Main downtown section of Ottawa (Section A)	September 1, 2001 *
Other downtown areas of Ottawa (Section B)	September 1, 2001 *
Residential Ottawa west of the Rideau River (Section C)	September 1, 2001 *
Residential Ottawa east of the Rideau River (Section D)	September 1, 2001 *
London	July 1, 2003
Kingston	May 1, 2003
Kitchener	January 1, 2000

* Ban imposed the previous month but not enforced until September

The basic regression model used for each jurisdiction or location is discussed next. The dependent variable in each equation is given in ratio form, which is:

$$\text{Ratio} = \frac{\text{Sales (or tax receipts) at bars and pubs}}{\text{Total retail sales}}$$

As noted above, the reason for estimating the impact with both sales and tax receipts data is that the two series do not always agree, and hence estimating separate regression equations reduces the probability that the results are due to erratic data points alone.

These ratios were then estimated as a function of the smoking ban dummy variable, seasonal dummy variables, value of the Canadian dollar, index of industrial production, unemployment rate, and the general trend of retail sales in that jurisdiction.

Four regression equations were estimated for each of the seven regions listed above. These four types of equations are as follows:

1. The ratio of tax receipts as a function of the smoking ban dummy variable and seasonal factors, but no economic terms.

2. The ratio of tax receipts as a function of the smoking ban dummy variable, seasonal factors, and some or all of the economic terms listed above.

3. The ratio of sales receipts as a function of the smoking ban dummy variable and seasonal factors, but no economic terms.

4. The ratio of sales receipts as a function of the smoking ban dummy variable, seasonal factors, and some or all of the economic terms listed above.

As noted above, our original plan also called for reestimating equations where the residuals were serially correlated, using the standard autocorrelation adjustment to insure that the t-ratios were not overstated. However, in virtually all cases with economic variables, there was no significant autocorrelation, so these results are not repeated in the study, as they are virtually identical with the included regressions.

In a few cases, either the tax or sales data had a few outlying observations that were statistically outside the range of the other data in that time series (more than 3 standard errors). We reestimated these equations (a) by omitting these data points, and (b) by using dummy variables for these outliers. However, there was hardly any difference in the results, so rather than argue over the issue of whether we engaged in "data mining" by adding dummy variables or omitting observations, we decided not to engage in "fine tuning" of the results. Because these equations showed no significant differences in the key smoking ban parameters, they are not reproduced here; in most cases, adding dummy variables increased the estimated impact of the smoking ban as well as increasing the significance of all the variables in the equations.

We emphasized in the previous section that a properly structured regression equation always includes the relevant economic variables. However, in several previous studies purporting to analyze the economic impact of smoking bans, researchers have presented graphs showing, at least based on visual inspection, that there is "no

economic impact" from the imposition of the ban. This "evidence" is then used to justify their shoddy econometric analysis.

Obviously there is a great deal more to this study than simply calculating the tax or sales ratios before and after the smoking ban. On the other hand, one could conceivably be justified in arguing that if there did not appear to be any negative impact from the raw data, the econometric results showing a significant effect might have been manufactured by our econometric techniques.

However, the economic impact of the smoking ban was so strong that in most cases, a significant decline can be seen in the sales and tax receipts data even when economic variables are not included. Even the raw data shows a significant drop shortly after the imposition of the ban (including time for the phase-in), with no significant recovery in later months or quarters. Hence we have also included separate regressions that contain only the seasonal dummy variables and the smoking ban variable to show the power of this bivariate relationship.

The economic variables must be included in any appropriate study, though, because the issue being examined is not only how much bar and pub sales declined after the smoking ban, but how much they declined **relative to what would have otherwise happened**. The appropriate variables are those factors that affect bar and pub sales, and restaurant sales generally, compared to overall retail sales. In this regard, other studies on sales at eating and drinking establishments that do not specifically address the issue of smoking bans have found that:

1. Over longer periods of time, where as total retail sales and disposable income grow at about the same rate, sales at eating and drinking establishments have an income elasticity greater than unity. This means they rise more than proportionately during times of economic prosperity, and rise less than proportionately (or actually decline) during periods of slack growth or actual recession.

This result had important ramifications during the extended period of prosperity during the 1990s, when many economic studies claimed to show that smoking bans had no negative impact – although in fact sales did in fact grow much less rapidly because of the smoking ban than would otherwise have been the case. In the current study, that variable was significant for parts of Ottawa, and for Kingston.

2. During different phases of the business cycle, sales of eating and drinking establishments rise faster during booms and slower during recessions relative to overall retail sales. For this reason, the index of industrial production and the rate of unemployment are included in some of these regression equations where appropriate.

3. Relative to total retail sales, a disproportionate amount of business at eating and drinking establishments stems from tourism. The value of the Canadian dollar relative to the U.S. dollar is used to measure the relative prices on different sides of the border. As fewer Canadian dollars are needed to buy one U.S. dollar, Canada becomes somewhat less attractive to U.S. tourists; or to look at it from the other side of the border, when the U.S. dollar falls in value, tourists are less likely to travel abroad because it is more expensive. Thus the series used in these equations (number of Canadian $ per U.S. $) is positively correlated with bar and pub sales in areas where tourism is relatively important. That is the case for Ottawa; if subsequent studies were taken to estimate the

impact of a possible smoking ban in Toronto, the value of the dollar would also be expected to be significant for that city.

All of the coefficients of the estimated equations – 4 regressions for each of the 7 regions listed in Table 1 – are presented in this report. Each set of regression equations has been calculated using the data for bar and pub sales and tax receipts separately; and with and without economic terms. Clearly the preferred equations include economic terms, but the other results are also included to show that even without these terms, the decline in sales following the imposition of the smoking ban is clear.

The results for sales and tax data ought to be the same, assuming the tax rate did not change during the sample period, but the monthly data are sometimes erratic. For this reason we have calculated regression for both sets of data in order to minimize the probability that the results are due only to the erratic nature of the data.

The presentation proceeds as follows. Table 1 provides the summary results of the coefficients for the smoking ban terms, listed in terms of elasticities – the percentage decline in tax or sales receipts that occurred shortly after the smoking ban was imposed. Table 2 summarizes the range of economic variables included in the regression equations. As would be expected, the value of the Canadian dollar is more important for Ottawa, whereas unemployment and production are more important for London, Kingston, and Kitchener, although some cyclical variables are also important in parts of Ottawa. The individual regression equations are discussed in Sections 4-10; the actual data used in the regressions is supplied in Appendix A; and the regression equations, coefficients, and t-ratios for all terms are given in Appendix B.

Table 1. Drop in Tax Receipts and Sales Caused by Smoking Ban

	Percentage Drop After Smoking Ban Imposed			
	Tax Receipts No Economic Variables	Tax Receipts Yes Economic Variables	Bar, Pub Sales No Economic Variables	Bar, Pub Sales Yes Economic Variables
Main Downtown Ottawa	6.1	13.3	2.7	32.0
Other Downtown Ottawa	11.3	11.9	13.5	16.5
West side residential Ottawa	27.8	25.7	30.6	26.8
East side residential Ottawa	14.8	17.0	9.2	18.8
London	12.3	10.0	16.3	18.7
Kingston	12.9	12.3	12.7	24.3
Kitchener	7.3	9.5	15.6	20.4
Average	13.2	14.2	14.4	22.5
Ottawa	15.0	17.0	14.0	23.5
Other cities	10.8	10.6	14.9	21.1

The decline in sales following the imposition of a smoking ban was 23.5% lower for Ottawa and 22.5% lower for all cities included in this study than would have otherwise been the case. The decline in tax receipts following the imposition of a smoking ban was 17.0% in Ottawa and 14.2% in all cities compared to what would have otherwise occurred. The regression equations also show that even without any economic variables, bar and pub sales declined an average of 14.4% after the imposition of the smoking ban, hence thoroughly discrediting that claim that smoking bans do not harm sales at bars and pubs; tax receipts declined an average of 13.2% without including the effects of any economic variables. This leads us to assume that the tax receipts are based on average or expecte d sales and hence do not clos ely reflect actual changes in sales in any given month.

Table 1 also shows that Including the economic variables in the sales equations boosts the calculation of the average loss by about 8 percentage points. Table 2 indicates which economic variables are used in each of the individual regression equations.

Table 2. Checklist of Economic Variables Used in the Regression Equations

	Value of Canadian Dollar	Index of Industrial Production	Unemployment Rate	Retail Sales Trend
Main Downtown Ottawa	xx			x
Other Downtown Ottawa	xx	x		
West side residential Ottawa	xx	xx		
East side residential Ottawa	xx			x
London		x	xx	
Kingston		xx	x	x
Kitchener		xx		

Number of x's indicates whether the term appears in one or both regressions containing economic variables

One would expect the value of the Canadian dollar to be relatively more important in Ottawa, and less important in smaller cities less likely to attract tourists. Conversely, cyclical variables such as industrial production and the unemployment rate should be less important in Ottawa. These patterns are indeed borne out by the actual regression results.

We now turn to the actual regression equations, which are organized by region. All the equations for any given region are listed together, and are described in Sections 4-10 of this report. This way, the similarities and differences for the alternative specifications can be more easily compared . Summary information is presented in

both graphical and tabular form. The actual data used in each regression is given in Appendix A, which also includes a more detailed discussion of some of the issues associated with individual data series. Appendix B provides the actual equation statistics for all terms including seasonal dummy variables in the EViews format.

As will be seen, many series are dominated by seasonal fluctuations. Thus in order to present the essence of the results, we also show the deseasonalized data for the ratios of tax receipts to total retail sales and bar and pub sales to total retail sales, with a vertical line indicating the date the smoking ban was imposed. We then show graphs of the actual and simulated values of the regression equations for tax receipts and sales including economic variables. The graphs are accompanied by a discussion of the structure of the equation and the individual terms included.

4. Regression Equations and Results for the Main Downtown Section of Ottawa (Ottawa A)

The summary statistics for the five equations for the main downtown region of Ottawa are shown in Table 4. As noted above, complete statistical information for these equations is given in Appendix B.

Region A in Ottawa covers 18 establishments in the Lowertown, Byward Market, Rideau Street, and Sandy Hill areas. There were a total of 109 licensees doing business in this Forward Sortation Area (KIN) in 2003, representing approximately 15% of the total number of establishments selling alcoholic beverages in Ottawa. Region A has the second highest concentration of food service and drinking place enterprises in Ottawa.

Table 4. Key parameters in regression equations for the main downtown section of Ottawa

Ottawa Main Downtown (Ottawa A)

Dependent Variable	Effect of Smoking Ban	Value of Canadian Dollar		Unempl Rate	Retail Sales Trend	Adjusted R-Square D-W stat
TAXES						
Coeff	-0.0686					0.932
T-statistic	4.2					1.37
Elas, %	**6.1**					
Form	Distr Lag					
Lag if any	0-6 mos					
			(Can $)			
Coeff	-0.1496	0.623	0.0101	-0.155	0.00185	0.952
T-statistic	3.8	1.8	3.3	1.7	2.2	1.86
Elas, %	**13.3**					
Form	Distr Lag	Mov Avg	% Chg	Change	Mov Avg	
Lag if any	0-6 mos	6,6	3,3		7,5	

SALES			
Coeff	-0.377		0.407
T-statistic	0.4		1.78
Elas, %	**2.7**		
Form	Distr Lag		
Lag if any	0-6 mos		
Coeff	-4.549	58.38	0.449
T-statistic	2.1	2.1	1.99
Elas, %	**32.0**		
Form	Distr Lag	Mov Avg	
Lag if any	0-6 mos	6,12	

The naïve model – equations with only seasonal dummy variables and the smoking ban variable -- show only a very slight imposition of the smoking ban in downtown Ottawa, having reduced tax receipts by 6.1% and sales by only 2.7%. As will soon become obvious, those estimates are grossly understated. Nonetheless, we mention them because they provide a useful insight into the underlying rationale behind these regressions. Anti-smoking activists have often used the naïve model as "evidence" that smoking bans have little or no actual effect, whereas the underlying economic data clearly show that the impact was at least 13% and as high as 32%. In general, the more rapid growth of the main downtown area of Ottawa, and the relatively low value of the Canadian dollar during most of this period, attracted both domestic trade and foreign tourists. In the absence of the smoking ban, then, growth in bar and pub sales in the main downtown region of Ottawa would have risen much more rapidly than was actually the case.

In all of the regression equations for Ottawa, the smoking ban dummy variable enters the equation with a distributed lag over a six-month period; the weights are greatest in the current month, and then decline linearly over the previous six months. In fact the optimal goodness-of-fit statistics and highest elasticities for the smoking ban variable were obtained by using a variety of different lag structures, but the difference were fairly small. In order to avoid any criticism about "curve fitting" this variable, we have used the same lag structure for all 16 of the Ottawa equations.

The key economic variables in the equation are the value of the Canadian dollar and the overall trend in Ottawa retail sales. Note in particular that the value of the dollar has a longer lag structure than the other variables; this result occurs only for the main downtown section of Ottawa. Many groups that plan conventions and meetings based on relative costs make their decisions based on exchange rates the previous year; whereas outside the main downtown area, decisions by individual tourists are more likely to be based on the value of the exchange rate over the last few months. In the tax receipts equations, the value of the dollar appears with both a short and a long lag, representing both of these phenomena.

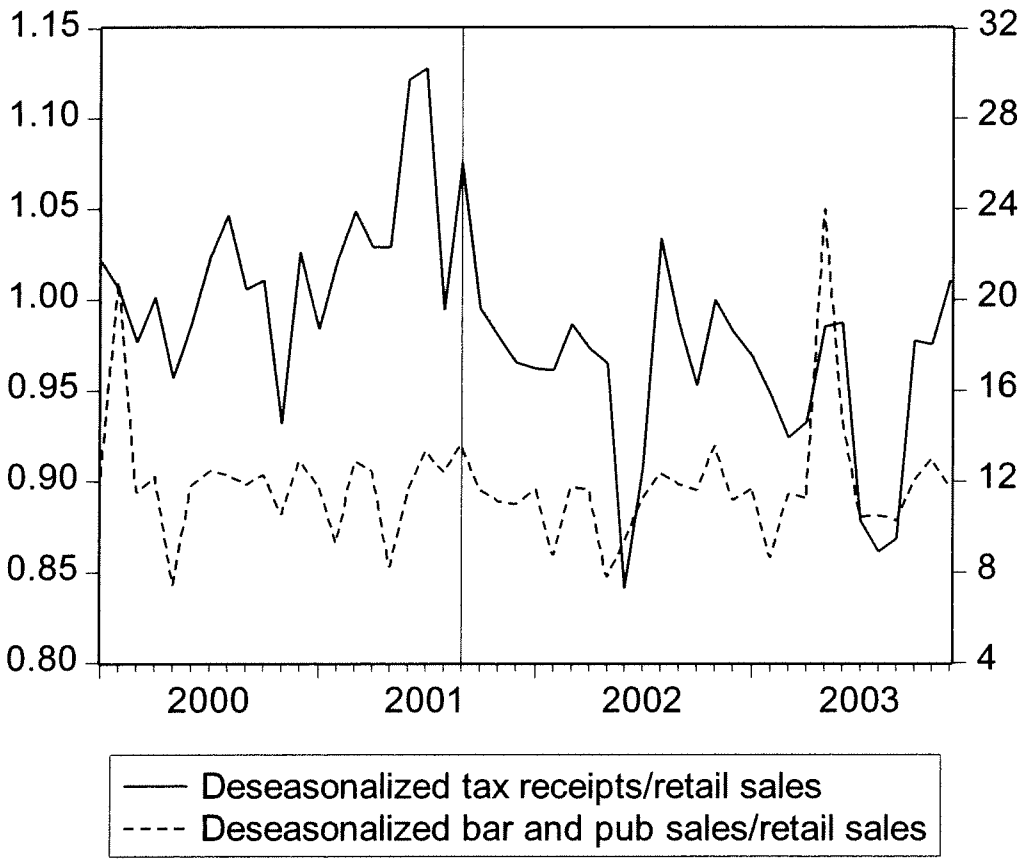
The difference in the estimates between the regressions with tax receipts and the regressions with bar and pub sales for this region of Ottawa are much larger than for any other region. Both series exhibit a strong seasonal pattern, as shown in Figures 4.2 and 4.3, but in addition, the figure for sales has a one-month spike in May, 2003. We

reestimated the regression (a) omitting this observation, and (b) treating it with a dummy variable. In both cases the key parameter for the purposes of this study, namely the impact of the smoking ban, was virtually unchanged. In the end we decided to accept the data at face value rather than "fine-tuning" the results by experimenting with a large variety of dummy variables.

The regressions for each region are accompanied by three graphs. The first graph shows the deseasonalized data for the sample period, with the date of the smoking ban denoted by a vertical line. We have chosen this approach because in many areas – especially in the main downtown section of Ottawa – the seasonal factors dominate, making it more difficult to see the overall impact of the smoking ban. These graphs are then followed by the actual and simulated values for the actual ratios of tax receipts and bar and pub sales relative to total retail sales in each region.

The data show a strong seasonal pattern, reflecting the fact that this area of Ottawa is the premier tourist and entertainment zone in the National Capital Region. Sales gradually tended higher over the 2000-2003 sample period; in particular, the 9-11 terrorist attacks in New York City and the alleged effect of the high-tech slowdown on sales in the Byward Market area are not apparent in these data. Similarly, the SARS scare did not seem to have any measurable negative impact on sales.

Figure 4.1. Deseasonalized ratios of bar and pub sales and tax receipts relative to total retail sales for the main downtown section of Ottawa



In all of these graphs, the tax receipts and bar and pub sales figures have been multiplied by 1000 so the coefficients in the equations do not have so many zeros. Hence bar and pub sales account for about 1% (0.01) of total retail sales, as opposed to the 12 shown in the graph. The tax rate is about 8%, so tax receipts divided by retail sales would be about 0.1% (0.001) compared to the 1.00 figure shown in the graph. Similar comments apply to all the other graphs in this report.

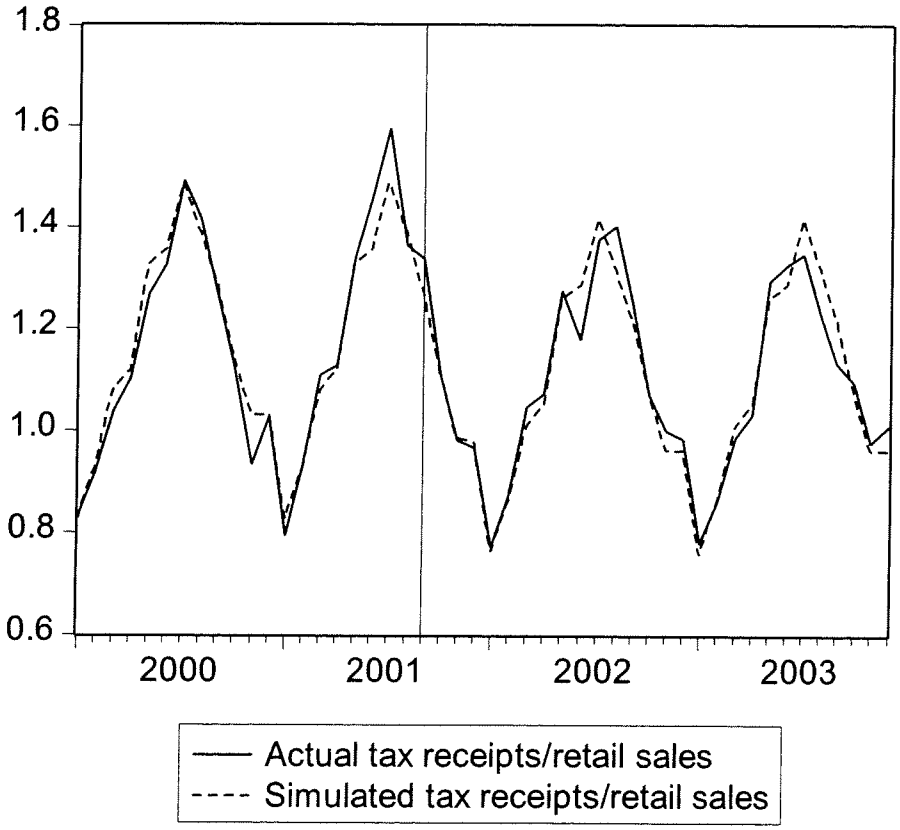
The decline in tax receipts after the phase-in period for the smoking ban can be seen on this graph; if the odd fluctuation that accounts for a sharp drop in June 2002 and the equally sharp rebound are ironed out, the downward trend is seen to continue for most of the sample period until a slight improvement occurs in late 2003, following a pickup in the overall economy.

The decline in sales revenues is more difficult to observe visually because of the surge in May 2003, but excluding that, it is clear that revenues declined in late 2001 and early 2002 before improved economic circumstances generated a recovery.

Both series appear to have one major glitch in the data; the tax data in June 2002 and the sales data in May 2003. As noted elsewhere in this report, the elasticity of the smoking ban impact is virtually unchanged if these variables are omitted or treated with dummy variables.

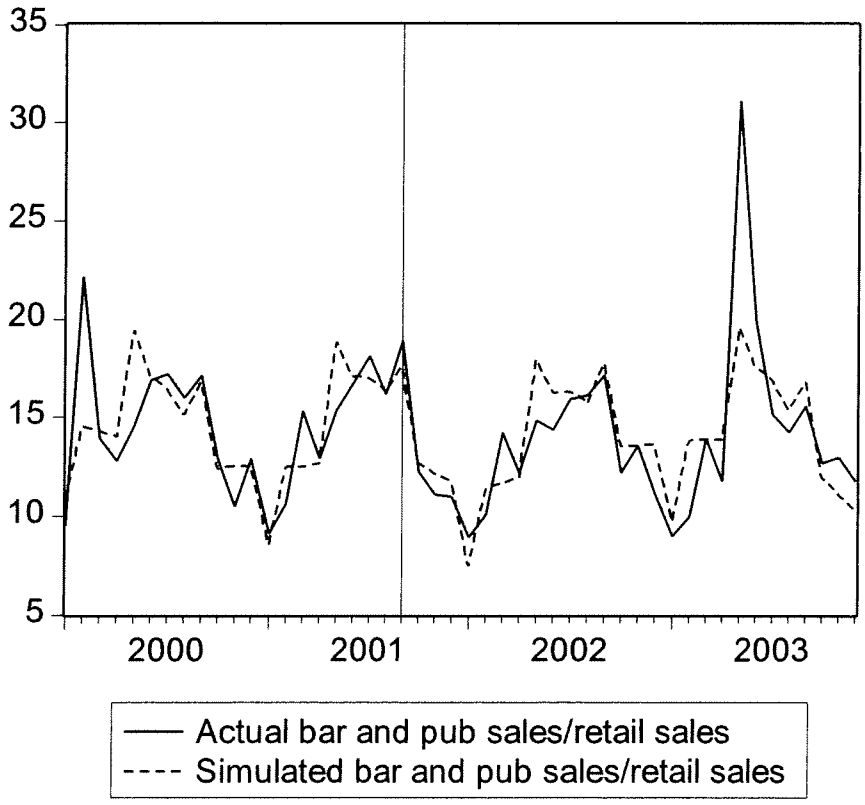
Figure 4.2 shows the actual and simulated ratio of tax receipts at bars and pubs to total retail sales in the main downtown section of Ottawa. It is readily observed that the seasonal pattern dominates. However, it can also be noted that the peaks in the summer months of 2002 and 2003 are well below those in 2000 and 2001 in spite of an improving economy and the favorable impact of the (lagged) relatively weak Canadian dollar.

Figure 4.2 Actual and Simulated Ratio of Tax Receipts to Retail Sales for the main downtown section of Ottawa



To a certain extent, the data points in Figure 4.3 are dominated by the one surge in sales in May 2003. If that point is ignored, the general decline in sales receipts after the imposition of the smoking ban can be observed. Note in particular that sales fell sharply in the months after the imposition of the ban, although part of that reflects seasonal factors. After that, sales rose again, although they did not return to previous peaks except for May 2003. In this regard, though, it is important to note that sales would have picked up much more rapidly if the smoking ban had not been imposed because of the recovery of the economy and the favorable impact of the Canadian dollar. That provides convincing evidence of the importance of including economic variables in the equation.

Figure 4.3 Actual and Simulated Ratio of Bar and Pub Sales to Retail Sales for the main downtown section of Ottawa



5. Regression Equations and Results for the Other Downtown Section of Ottawa (Ottawa B)

The results for the tax and sales regression equations for the remaining downtown section of Ottawa are more consistent than for the main downtown section. Based on the sales receipts data, the smoking ban reduced activity by 17%, and based on the tax receipts data, the ban reduced activity by 12%.

The area covered in Region B includes the entire central business district (CBD) west of the Rideau Canal, the Centretown residential area, the Dalhousie residential area, and the Glebe and Old Ottawa South residential communities. Embedded within this largely residential central city area (excluding the eastern two-thirds of the Central Business District) are a number of the city's major retail and commercial corridors: Preston Street, Somerset Street, Bank Street, Elgin Street, Gladstone Avenue, and to a certain degree, Bronson Avenue.

The downtown worker population of the CBD is largely located west of the Rideau Canal in the Ottawa B area; the 2001 Census figure given is 68,000. By comparison, the residential population of Ottawa B was 44,000. With the exception of the CBD adjacent to the Parliamentary Precinct north of Wellington Street, this area of the city does not have the tourist draw of the Market Area in Ottawa A. Without that attraction, sales of food service and drinking place establishments is largely dependent on local residents and the downtown worker population. Ottawa B contains 175, or 24%, of the city's licensed establishments; while that is a higher number of businesses than in Ottawa A, it is spread out over an area nearly four times as large.

The summary statistics are given in Table 5.

Table 5. Key parameters in regression equations for the other downtown sections of Ottawa

Ottawa Other Downtown (Ottawa B)

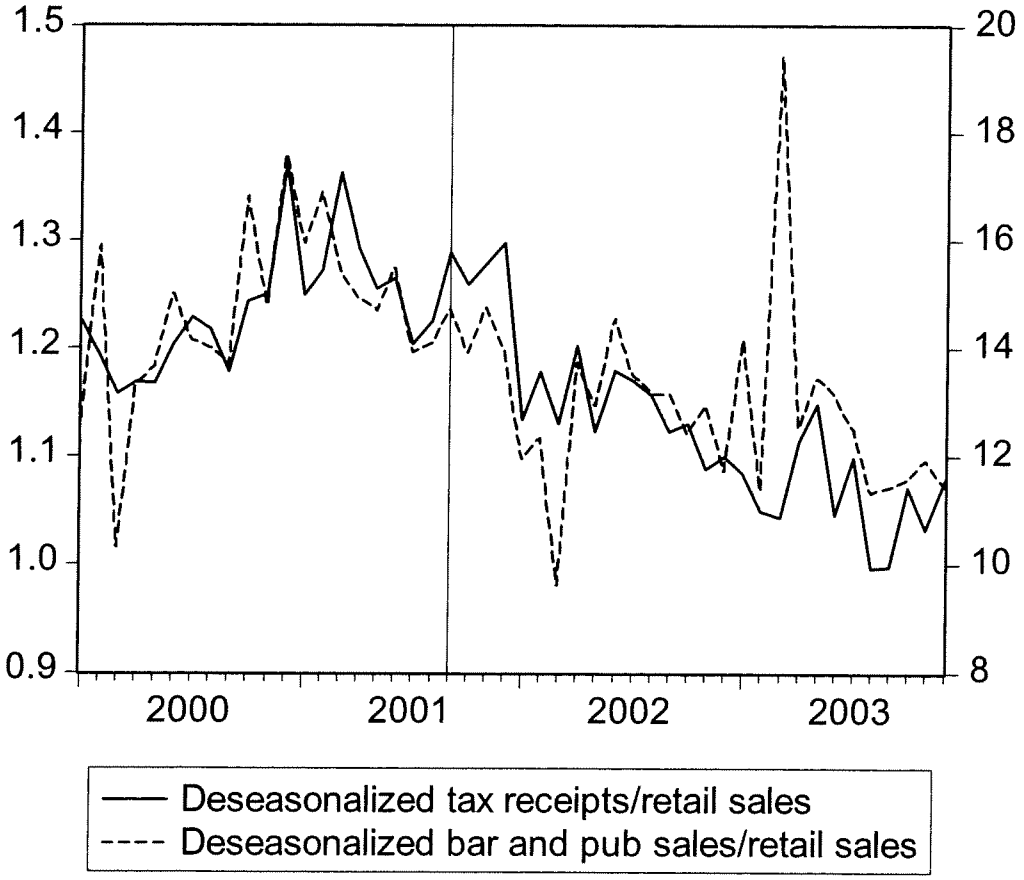
Dependent Variable	Effect of Smoking Ban	Value of Canadian Dollar	Industrial Production	Unempl Rate	Retail Sales Trend	Adjusted R-Square D-W stat
TAXES						
Coeff	-0.134					0.599
T-statistic	6.5					0.78
Elas, %	**11.3**					
Form	Dist Lag					
Lag if any	0-6 mos					
Coeff	-0.141	0.614				0.754
T-statistic	8.7	5.2				1.20
Elas, %	**11.9**					
Form	Dist Lag	Mov avg				
Lag if any	0-6 mos	1,3				
SALES						
Coeff	-1.910					0.344
T-statistic	3.6					1.96
Elas, %	**13.5**					
Form	Dist Lag					
Lag if any	0-6 mos					
Coeff	-2.343	5.84	0.383			0.428
T-statistic	2.3	1.9	2.4			2.38
Elas, %	**16.5**					
Form	Dist Lag		Mov Avg			
Lag if any	0-6 mos		6			

There are several reasons why the decline in sales caused by the smoking ban is more severe than in Ottawa A. First, as already noted, there is far less tourist trade, so the region did not benefit as much from the relatively inexpensive Canadian dollar during much of this period. Second, outdoor patios – where smoking is allowed – are far less prevalent in Region B than in Region A. Third, because of the greater importance of local business relative to tourism, cyclical variables are more important. In particular, the index of industrial production enters the equation, with a moving average over the past 6 months. The value of the Canadian dollar enters with a shorter lag, suggesting that

tourism in this section of the city reacts with a shorter lag, indicating more short-term and casual tourists and fewer major meetings planned a year or more in advance.

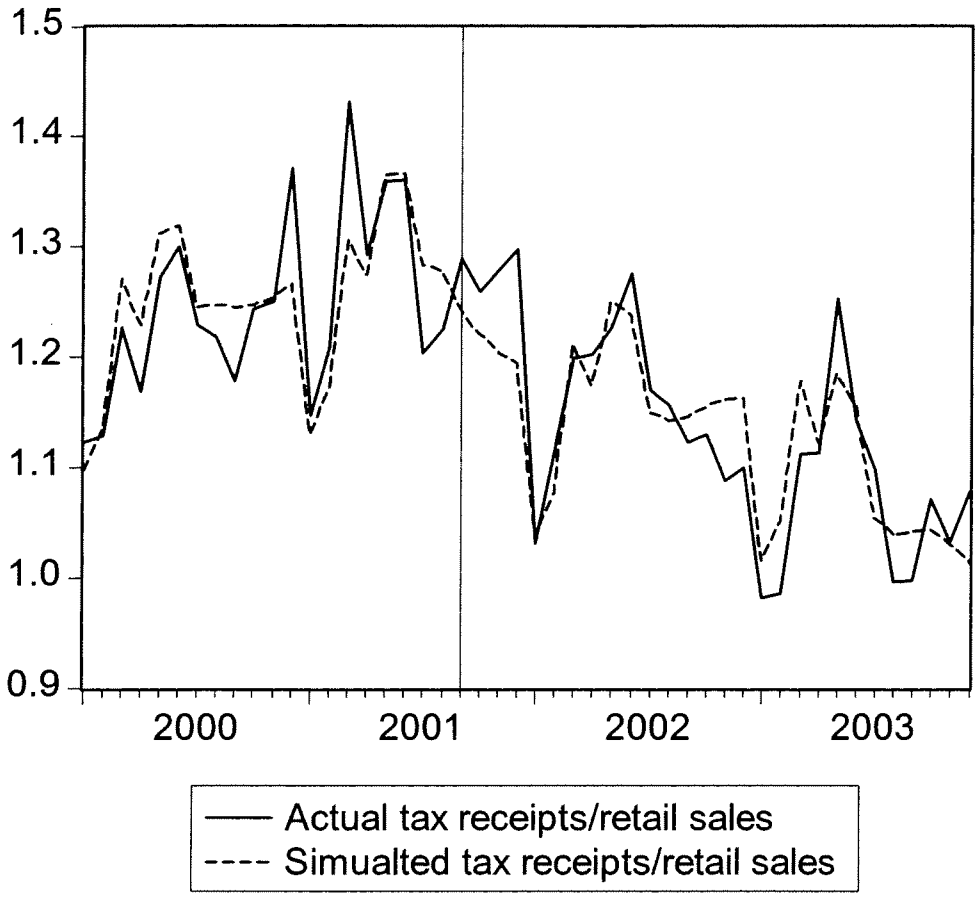
Unlike the main downtown section, the drop in taxes and sales after the smoking ban can easily be seen from the raw data. In fact, the elasticities for the tax receipts data without any economic terms are almost identical. These data are shown in Figure 5.1.

Figure 5.1. Deseasonalized ratios of bar and pub sales and tax receipts relative to total retail sales for the other downtown section of Ottawa



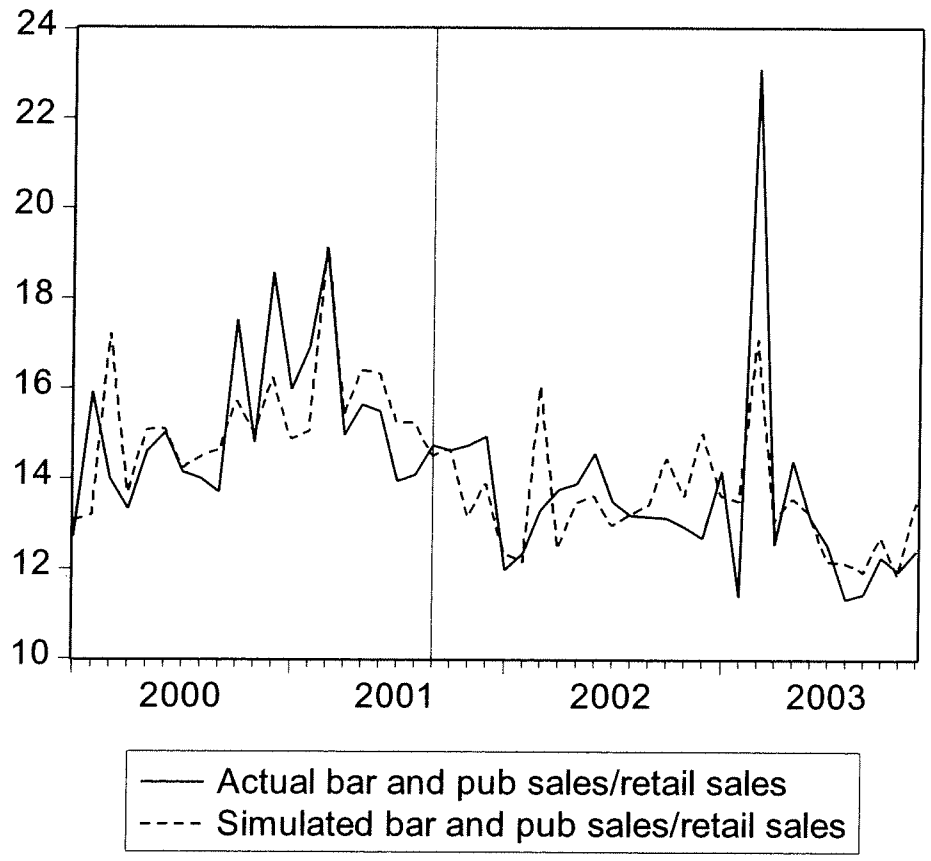
Here again the sales data spike in early 2003, although in this case it is March rather than May. Except for this one anomaly, the data tell a fairly compelling story: taxes and sales generally rose until the imposition of the ban, and then, after a brief adjustment period, start falling sharply at the beginning of 2002 and never recovered.

Figure 5.2 Actual and Simulated Ratio of Tax Receipts to Retail Sales for the other downtown section of Ottawa



Except for the spike in sales in March 2003, the sales data show a very strong reversal of the trend after the imposition of the smoking ban. Sales rose steadily in 2000 and continued to increase in 2001, although at a slower rate, in spite of the recession. However, after showing little change in the last four months of 2001, sales then declined sharply in 2002 and continued to move lower, representing the phase-in effect of the smoking ban. Except for the one spike, sales then continued to move lower in 2003.

Figure 5.3 Actual and Simulated Ratio of Bar and Pub Sales to Retail Sales for the other downtown section of Ottawa



6. Regression Equations and Results for the residential section of Ottawa west of the Rideau River (Ottawa C)

The negative economic impact of the smoking ban is strongest for this section of Ottawa; in fact, the decline is so sharp it was due to economic variables as well as the imposition of the ban. In particular, the elasticities for the smoking ban parameter actually decline slightly when the economic terms are added; this is the only area where that occurs. We also used regression estimated to determine whether the decline was due to a downward trend in addition to the economic parameters, but it was not significant.

The Ottawa C region encompasses all of urban Ottawa west of the Rideau River except for the areas already discussed in regions A and B. This area includes old Ottawa's west end, the former City of Nepean, the former City of Kanata, and the former Townships of Rideau, West Carleton, and Goulbourn. In this area, 31 establishments were selected, of which 24 are located in old Ottawa and former Nepean. Since this area includes the vast majority of the high-tech establishments in Ottawa, sales declined rapidly as employment in this sector diminished sharply.

Indeed, of the six establishments in the survey sample located close to the high tech nodes in the west end, three were out of business by the end of 2004. The combined impact of the smoking ban and drop in employment in the information technology sector drove these firms out of business.

Table 6. Key parameters in regression equations for the residential section of Ottawa West of the Rideau River

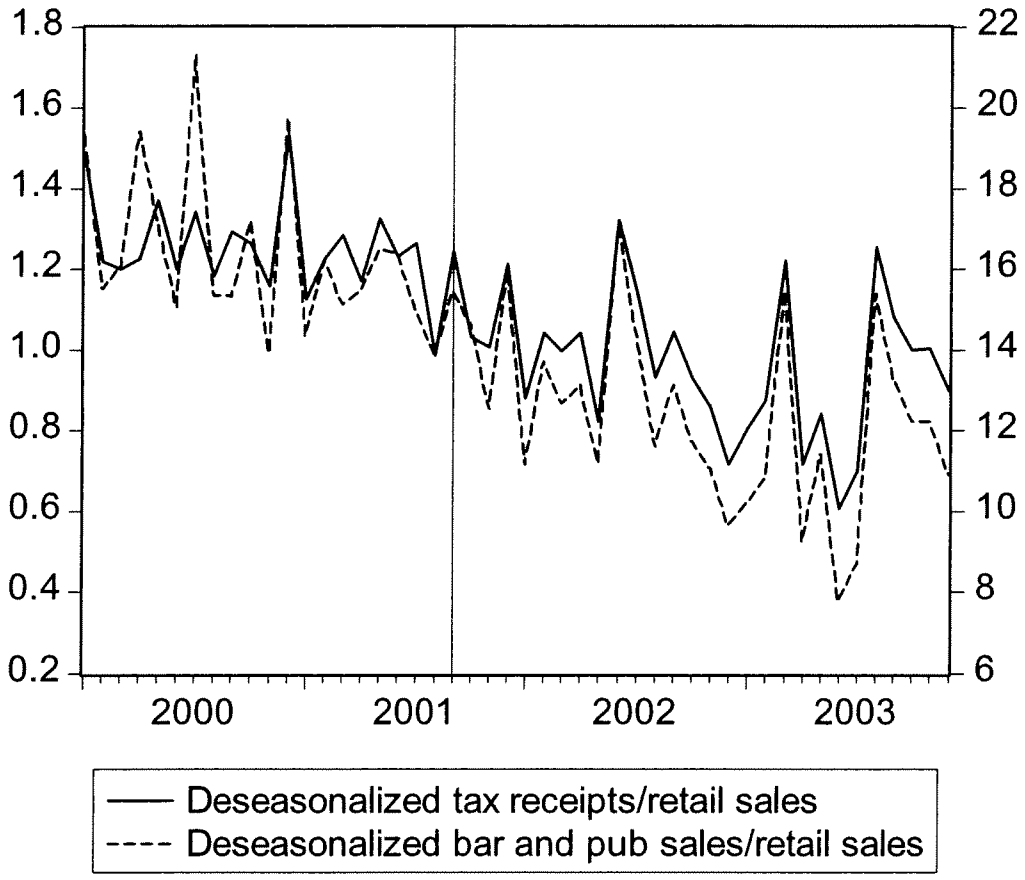
Residential Ottawa West of Rideau River (Ottawa C)

Dependent Variable	Effect of Smoking Ban	Value of Canadian Dollar	Industrial Production	Unempl Rate	Retail Sales Trend	Adjusted R-Square D-W stat
TAXES						
Coeff	-0.309					0.522
T-statistic	6.3					1.96
Elas, %	**27.8**					
Form	Dist Lag					
Lag if any	0-6 mos					
Coeff	-0.286	0.0297	0.0292			0.580
T-statistic	5.7	1.7	1.8			2.26
Elas, %	**25.7**					
Form	Dist Lag	% Chg	% chg			
Lag if any	0-6 mos	1,1	3			

SALES				
Coeff	-4.347			0.483
T-statistic	6.2			2.32
Elas, %	**30.6**			
Form	Dist Lag			
Lag if any	0-6 mos			
Coeff	-3.805	0.469	0.232	0.529
T-statistic	5.3	2.1	1.5	2.47
Elas, %	**26.8**			
Form	Dist Lag			
Lag if any	0-6 mos			

The economic impact of the smoking ban has been greater for this section of Ottawa than elsewhere in the city, with the elasticity estimates ranging from 25.7% to 30.6%. The decline in tax receipts and bar and pub sales is clearly shown in Figure 6.1. It is worth mentioning that this is the only section of Ottawa where the tax and sales data do not show any monthly glitches. While this does not prove anything, it is nonetheless noteworthy that in the one area where the data are most likely to be accurate, the results show the biggest negative impact of the smoking ban.

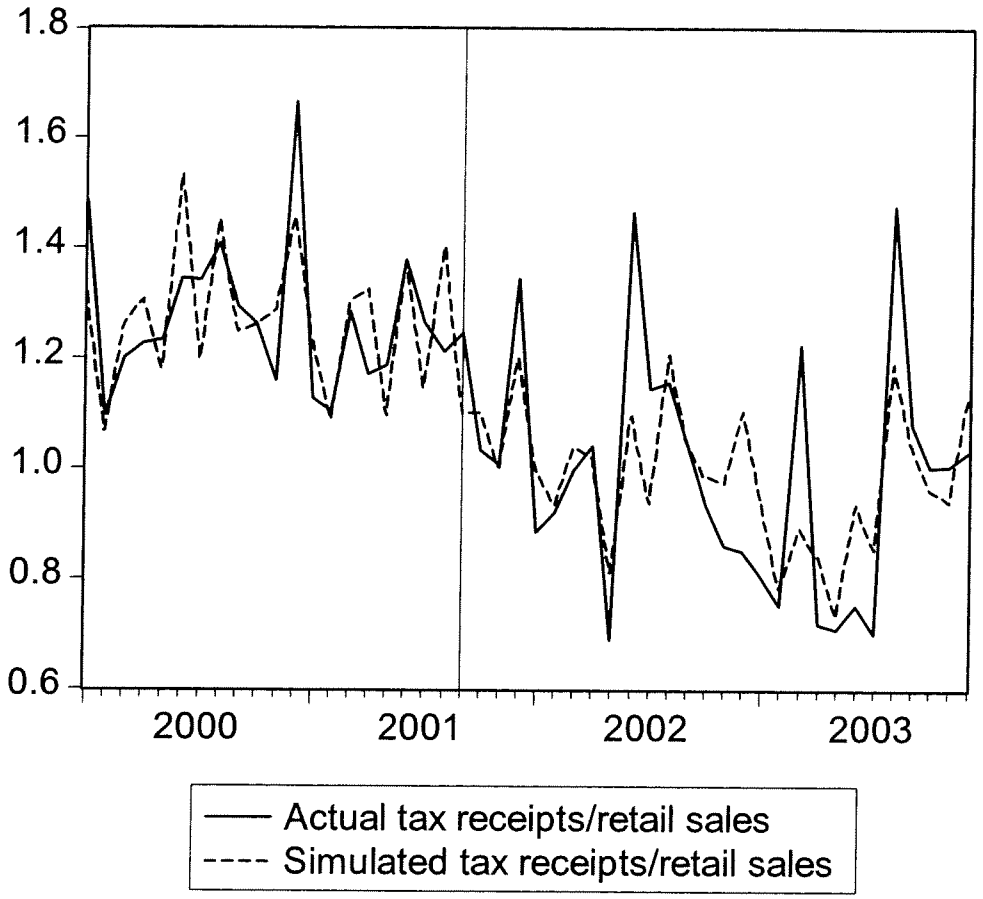
Figure 6.1. Deseasonalized ratios of bar and pub sales and tax receipts relative to total retail sales for the western residential section of Ottawa



The data are still not without their monthly wiggles, but both sales and taxes move together in almost all cases. Here again there is a spike in March 2003, but this time both taxes and sales rise, so it is probably not the result of a data fluke.

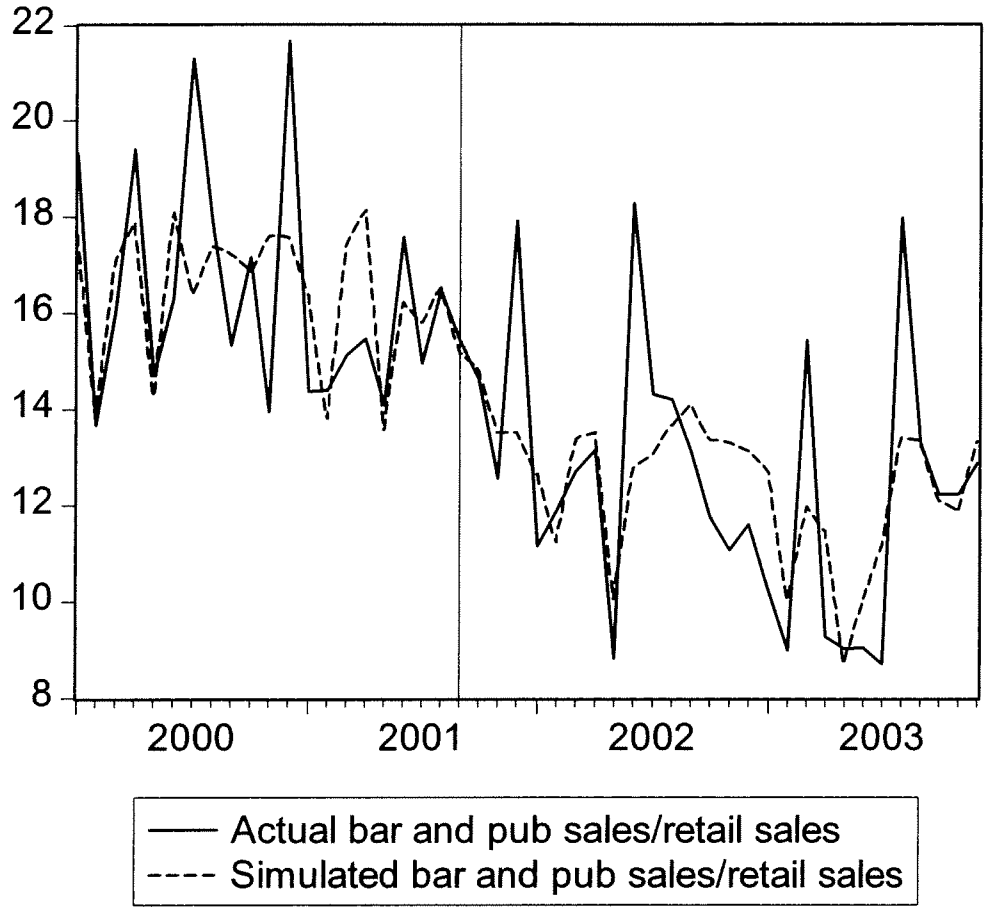
The sharp downward trend after the imposition of the ban is unmistakable, with little sign of a turnaround until the latter half of 2003. After the smoking ban was imposed, both sales and tax receipts fell very rapidly, but it does appear that sales fell somewhat faster than tax receipts.

Figure 6.2 Actual and Simulated Ratio of Tax Receipts to Retail Sales for the western residential section of Ottawa



The key economic variables in this equation are the value of the Canadian dollar, with a short lag of 1 to 2 months, and the index of industrial production, with a lag of 0 to 3 months. Percentage changes are used for both these variables. It would appear that the adjustment effect of the smoking ban lasted well into 2002 before tax receipts stabilized ; they then moved lower again in late 2002 and early 2003.

Figure 6.3 Actual and Simulated Ratio of Bar and Pub Sales to Retail Sales for the western residential section of Ottawa



The key economic variables in these equations, as is the case for other sections of Ottawa, are the value of the Canadian dollar and the index of industrial production, both with short lags. In spite of the somewhat erratic monthly shifts, the downward pattern starting in 2002 is unm istakable.

7. Regression Equations and Results for the residential section of Ottawa east of the Rideau River (Ottawa D)

The results for this section of Ottawa show almost identical parameter estimates for the tax and sales equations. The tax receipts equation shows a 17% drop after the imposition of the smoking ban, while the sales equation shows a 19% drop. The sales equation also indicates that the decline in sales would have been even more severe if it were not for the pickup of econom ic activity in 2003.

The area of Ottawa D encompasses all the urban areas of Ottawa east of the Rideau River. It includes old Ottawa's east end, the former City of Gloucester, the former Village of Rockliffe Park, and the form er Townships of Cumberland and Osgoode. Of the 25 business establishments selected, 19 are either in old Ottawa or former Gloucester. The east end has a significant advantage relative to other growth areas of the city because a significant amount of retail and commercial infrastructure is already in place.

Table 7. Key parameters in regression equations for the residential section of Ottawa East of the Rideau River

Residential Ottawa East of Rideau River (Ottawa D)

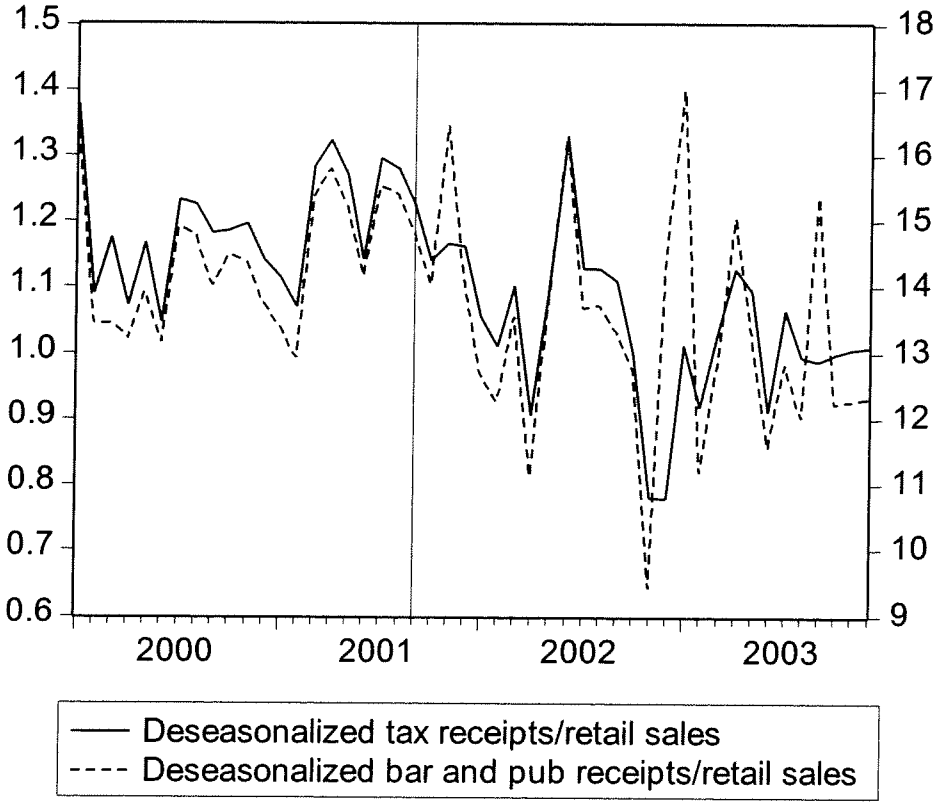
Dependent Variable	Effect of Smoking Ban	Value of Canadian Dollar	Industrial Production	Unempl Rate	Retail Sales Trend	Dummy Vbl for Spring	Adjusted R-Square D-W stat
TAXES							
Coeff	-0.169						0.283
T-statistic	3.7						2.18
Elas, %	**14.8**						
Form	Dist Lag						
Lag if any	0-6 mos						
Coeff	-0.195	0.608				0.312	0.680
T-statistic	5.9	2.2				7.3	1.40
Elas, %	**17.0**						
Form	Dist Lag						
Lag if any	0-6 mos	5					
SALES							
Coeff	-1.297						0.152
T-statistic	2.2						2.39
Elas, %	**9.2**						
Form	Dist Lag						

Lag if any	0-6 mos					
Coeff	-2.670	9.749		0.0613	3.61	0.530
T-statistic	3.0	2.4		1.4	6.0	2.03
Elas, %	**18.8**					
Form	Dist Lag					
Lag if any	0-6 mos	5		6		

A word about the seasonal adjustment procedures is appropriate at this point. Throughout this study, we have included seasonal dummy variables in all the regression equations. The alternative would have been to use some standard algorithm such as Census X-12 to adjust the data, but that choice is not available because X-12 operates on a minimum of 5 years data, with 8 years preferred. Hence the regression approach is utilized. In general, the seasonal factors obtained are reasonably stable with the exception of this particular section of Ottawa, where the seasonals for March and April flip-flop; in two of the four years the seasonals are high in March and low in April, whereas in the other two years the reverse occurs. There is some evidence of this pattern occurring in other Ottawa regions but it is not significant.

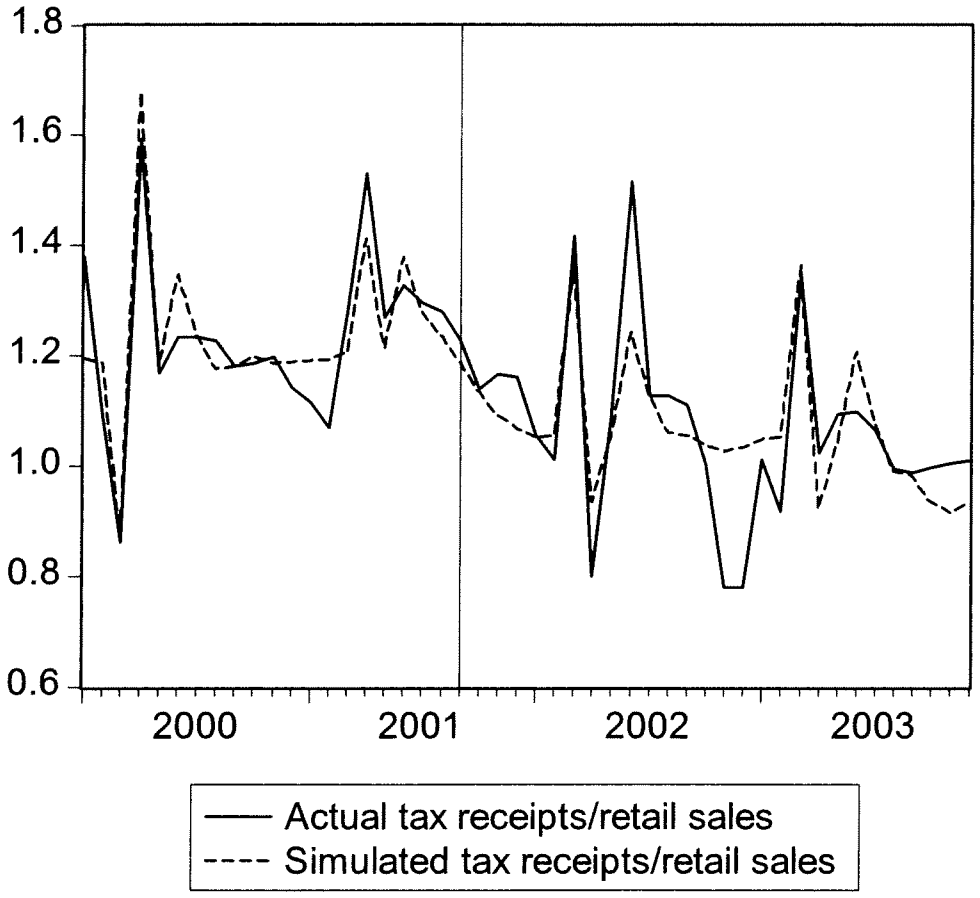
This pattern appears to be tied to when Easter occurs, a factor that would be captured in the X-12 program. To handle this difficulty, we have added an additional "spring" seasonal dummy variable to measure this effect. Here again, we note that running the regressions without this term does not have any major impact on the coefficients for the smoking ban; but without it, the net effect is that the adjusted R-square falls to about 0.1 and none of the economic terms is significant.

Figure 7.1. Deseasonalized ratios of bar and pub sales and tax receipts relative to total retail sales for the eastern residential section of Ottawa



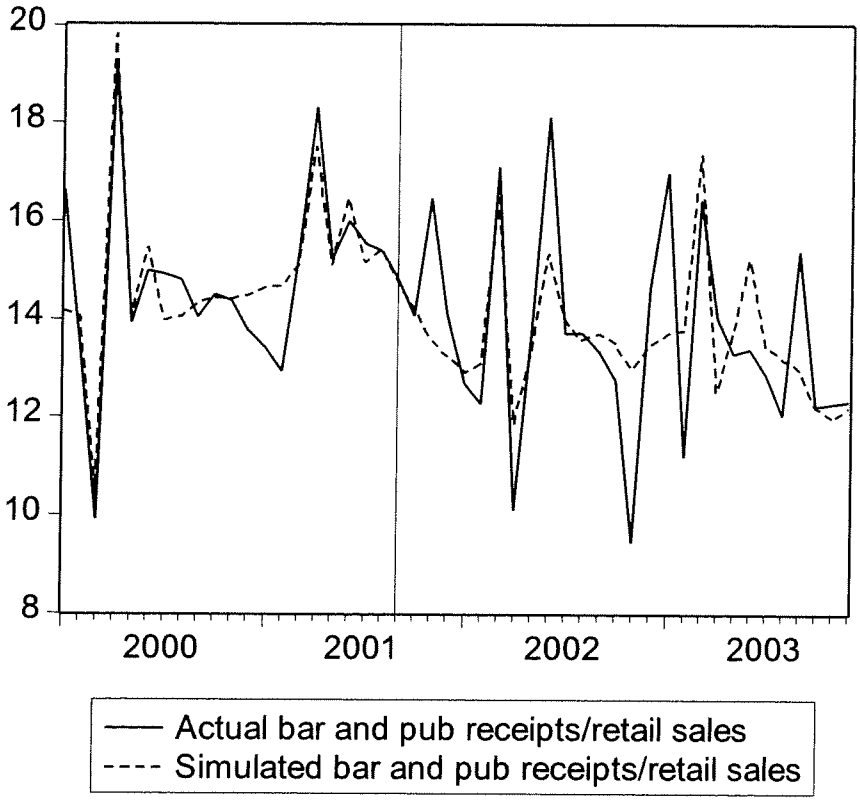
These data show that both tax receipts and bar and pub sales declined sharply after the imposition of the smoking ban. They then spiked back up again in June 2002 but then fell quickly again. Finally, they rose in 2003 along with the overall improvement in the economy.

Figure 7.2 Actual and Simulated Ratio of Tax Receipts to Retail Sales for the eastern residential section of Ottawa



In this equation, the key economic variable is the value of the Canadian dollar. None of the cyclical variables was significant, but that may reflect the fact that that data appear to be dominated by the spring seasonal dummy effect.

Figure 7.3 Actual and Simulated Ratio of Bar and Pub Receipts to Retail Sales for the eastern residential section of Ottawa



In this regression, the value of the Canadian dollar remains significant, as is the case for all other regions in Ottawa. Cyclical variables were not found to be significant, but the general upward trend of retail s ales in the region was m arginally significant in this equation. The same term had a t-ratio of less than unity in the tax receipts equation and hence was not included.

8. Regression Equations and Results for London, Ontario

The equations for the remaining three cities in this study – London, Kingston, and Kitchener – are slightly different than the equations for Ottawa, primarily because of data limitations. We have shown that the lag for the smoking ban variable in the Ottawa equations was six months, and have indicated in several cases that it may have taken even longer to be fully phased in for certain areas of Ottawa. We were able to perform an in-depth econometric analysis for that city because the smoking ban became effective in September, 2001, thus providing a reasonable number of observations both before and after the ban started.

On the other hand, the bans for London and Kingston did not go into effect until July and May 2003 respectively, hence sharply reducing the number of months during which the ban had its full economic impact. At the other end of the spectrum, the smoking ban for Kitchener went into effect on January 1, 2000, which is the beginning month of the sample. In other words, the ban was in effect during the entire sample period. That is why we tried to get data for 1999, but it was not available in a comparable form from the Ministry of Finance.

In order to finesse these difficulties, we have introduced another form of the smoking ban variable, which is the first difference of that term. This term appears in the sales equation for London, and both the sales and tax equations for Kingston and Kitchener. In all cases, the lag is seen to be 4 to 6 months, the same length that we found for Ottawa.

Table 8 shows the key parameters for the London equations. The tax receipts equations show a decline of about 10% when the smoking ban was implemented; in this case there is no lagged effect, although we caution that the short time span means that with 2004 data, a lag might be apparent. The sales data also shows no lag for the level of the smoking ban term, but it also appears with the change over the past six months – in this case, that would mean during the second half of 2003. We reiterate our position that when 2004 data become available, we will probably find that the effect of the smoking ban in London has a distributed lag effect over a six-month period, just as we found for Ottawa. In the absence of firm data, that result must necessarily remain somewhat speculative. In any case, when combining the level and first difference of the smoking ban term, it is seen that the overall effect of the smoking ban in London was to reduce sales by 16.3% during the second half of 2003.

Table 8. Key parameters in regression equations for London

Equations for London

Dependent Variable	Effect of Smoking Ban	Intro to Smoking Ban	Value of Canadian Dollar	Industrial Production	Unempl Rate	Retail Sales Trend	Adjusted R-Square D-W stat
TAXES							
Coeff	-0.102						0.623
T-statistic	5.2						1.30
Elas, %	**12.3**						
Form							
Lag if any							
Coeff	-0.083				-0.057		0.707
T-statistic	4.5				3.5		1.76
Elas, %	**10.0**						
Form					Mov Avg		
Lag if any					6,6		
SALES							
Coeff	-1.009	-0.538					0.461
T-statistic	2.5	0.8					1.87
Elas, %	**10.6**	**5.7**					
Form		Diff					
Lag if any		4,2					
Coeff	0.809	-0.972		15.87	-0.556		0.515
T-statistic	2.0	1.4		1.7	1.9		1.98
Elas, %	**8.5**	**10.2**					
Form		Diff		% Chg	Mov Avg		
Lag if any		4,2		1,2	6,6		

We now turn to the graphical representation for the London results. Although the monthly figures are extremely jagged, It can be seen that sales and tax receipts started to decline in 2001 and continued lower in 2002 – except for the one-month spike in sales in November 2002. That can be attributed to the lagged effect of the drop in industrial production and the rise in unemployment. When the economy started to improve – taking into account the lags associated with these variables – sales then started to improve in early 2003, but then dropped sharply in July, the month the smoking ban was imposed. They then headed lower for the rest of the year.

Figure 8.1. Deseasonalized ratios of bar and pub sales and tax receipts relative to total retail sales for London

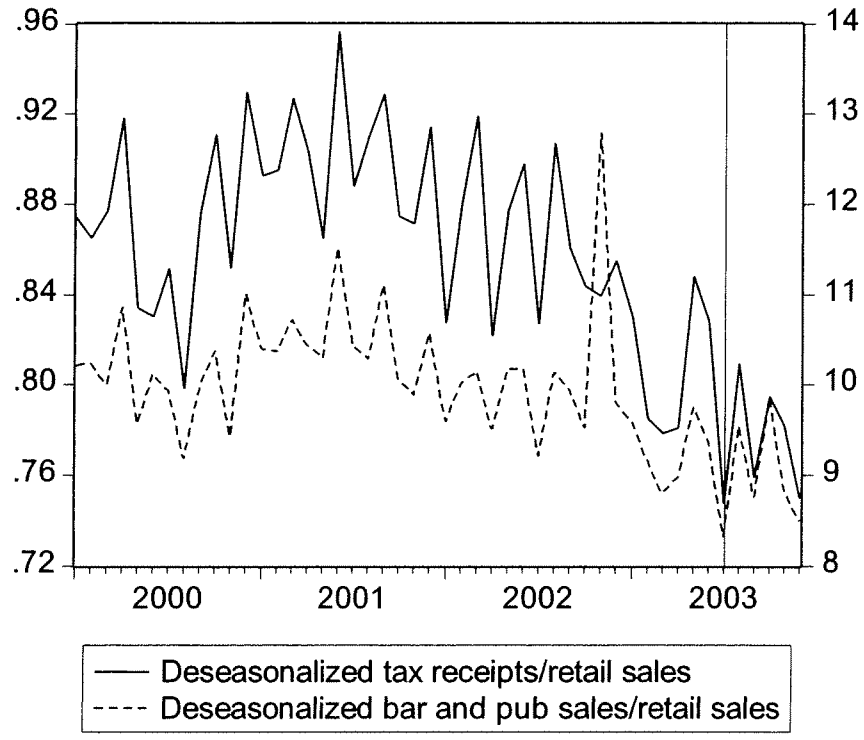
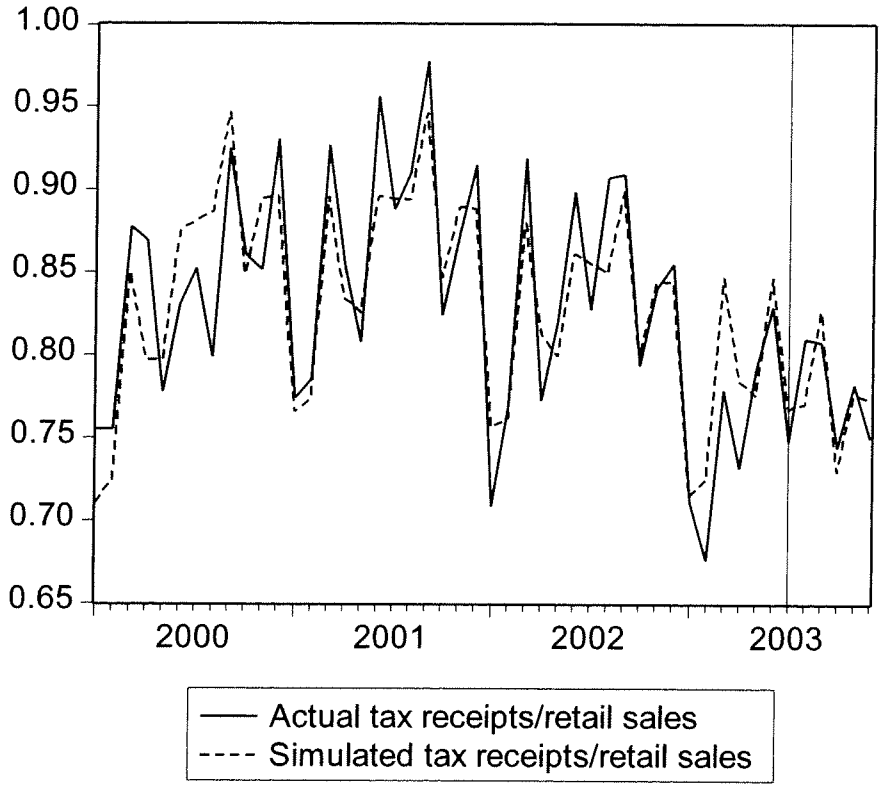
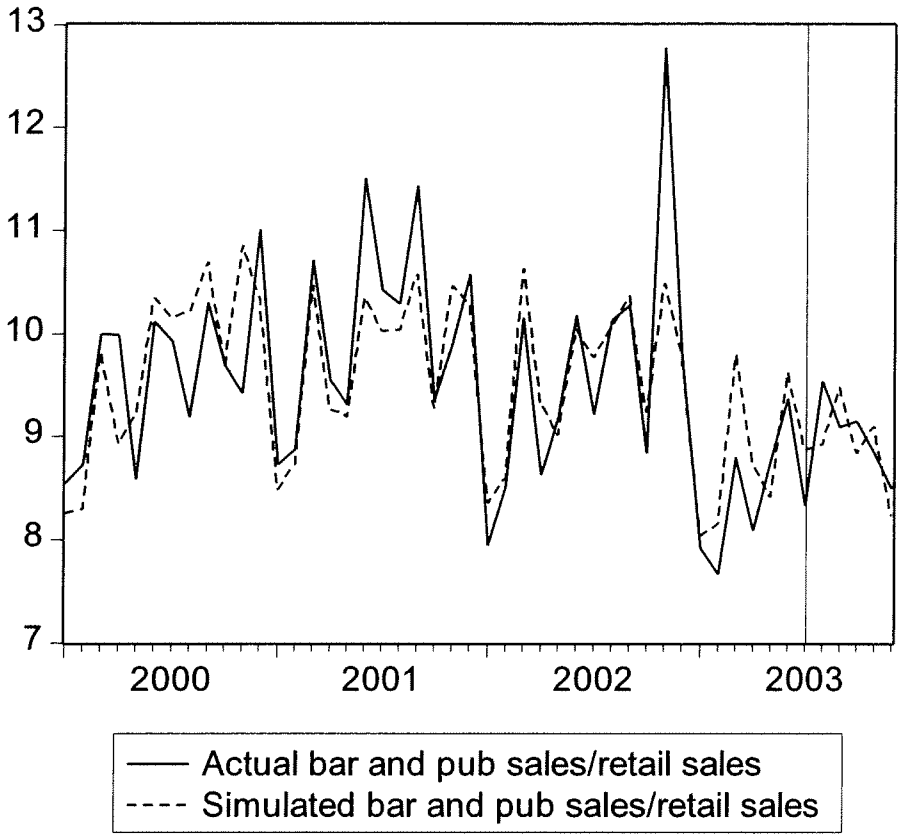


Figure 8.2 Actual and Simulated Ratio of Tax Receipts to Retail Sales for London



The key economic variable in this regression equation is the unemployment rate, with a moving average lagged 6 to 12 months. That accounts for the drop in sales in late 2001 and early 2002. Unlike Ottawa, the value of the Canadian dollar is not significant in any of the equations for London, Kingston, or Kitchener, nor would we expect it to be, given the minimal influx of tourists to these cities.

Figure 8.3 Actual and Simulated Ratio of Bar and Pub Sales to Retail Sales for London



The lagged value of the unemployment rate, using the same lags as were included in the tax receipts equation, remains the key economic variable in this equation. In addition, the percentage change in the index of industrial production is included with a shorter lag. This equation contains both the level of the smoking ban dummy variable and its change over the previous six months. As can be seen, sales dropped off fairly sharply near the end of the year after an initial rebound in August. It is likely that a distributed lag treatment of the smoking ban dummy variable, similar to the one used for Ottawa, would be significant if 2004 data were available.

9. Regression Equations and Results for Kingston, Ontario

The econometric situation for Kingston is similar to that for London in the sense that the smoking ban went into effect in mid-2003, although in this case the ban became operative in May rather than July. Hence we use the same dual structure for the smoking dummy variable: the level, and its first difference.

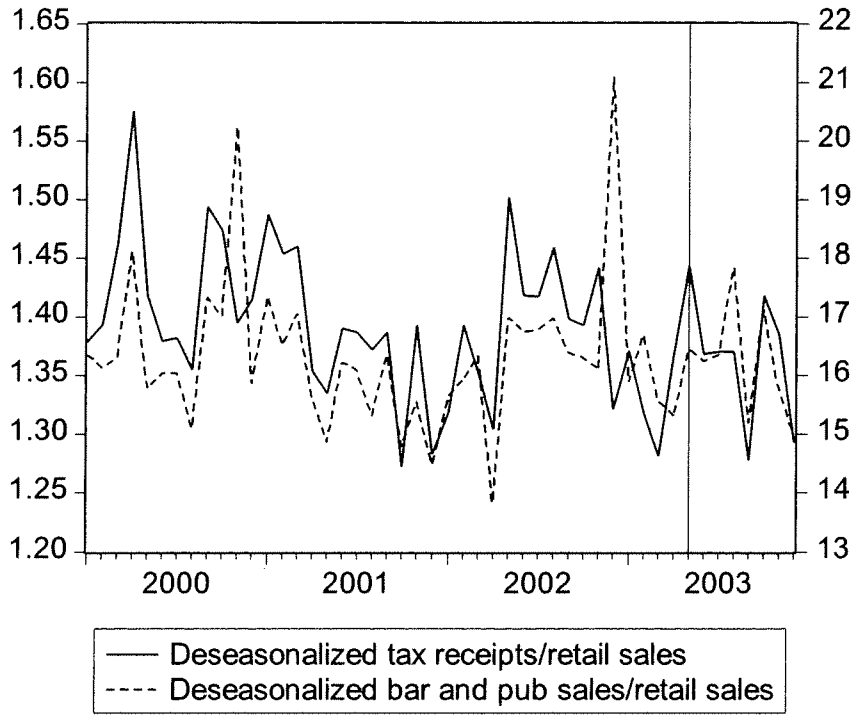
The results of these combined terms are quite robust; although the significance level of the separate terms appears to be marginal, the significance level of the combined terms (not shown separately) is much higher. The elasticity of the smoking ban dummy variable in the sales equation is 24.3%; the elasticity for the tax receipts equation is about half as much, or 12.3%.

Table 9. Key parameters in regression equations for Kingston

Equations for Kingston

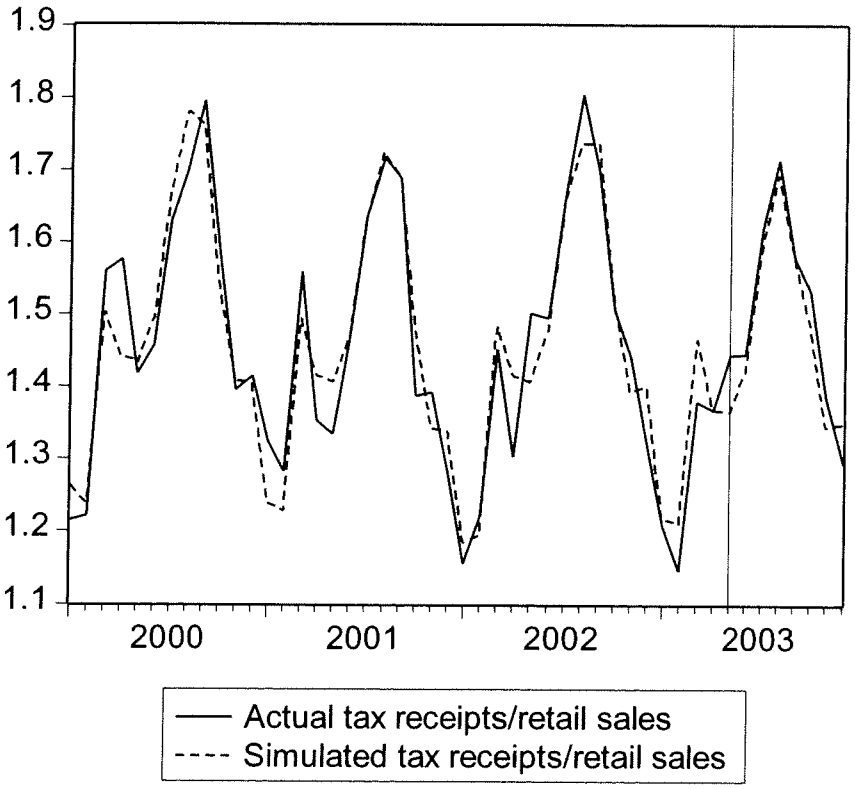
Dependent Variable	Effect of Smoking Ban	Intro of Smoking Ban	Value of Canadian Dollar	Industrial Production	Unempl Rate	Retail Sales Trend	Adjusted R-Square D-W stat
TAXES							
Coeff	-0.050	-0.135					0.841
T-statistic	1.0	1.7					1.38
Elas, %	**3.7**	**9.2**					
Form	Mov Avg	Difference					
Lag if any	4,4	4					
Coeff	-0.072	-0.107		0.991	-0.133		0.864
T-statistic	1.4	1.4		2.1	1.3		1.82
Elas, %	**4.9**	**7.4**					
Form	Mov Avg	Difference		% Chg			
Lag if any	4,4	4		0,6			
SALES							
Coeff	-1.040	-1.229					0.667
T-statistic	1.0	0.8					1.98
Elas, %	**5.8**	**6.9**					
Form	Mov Avg	Difference					
Lag if any	4,4	4					
Coeff	-2.486	-1.826		41.03	-3.923	0.0452	0.710
T-statistic	1.9	1.2		1.9	1.4	1.4	2.45
Elas, %	**14.0**	**10.3**					
Form	Mov Avg	Difference		% Chg	Difference	Mov Avg	
Lag if any	4,4	4		0.2 & 6,6		1,6	

Figure 9.1. Deseasonalized ratios of bar and pub sales and tax receipts relative to total retail sales for Kingston



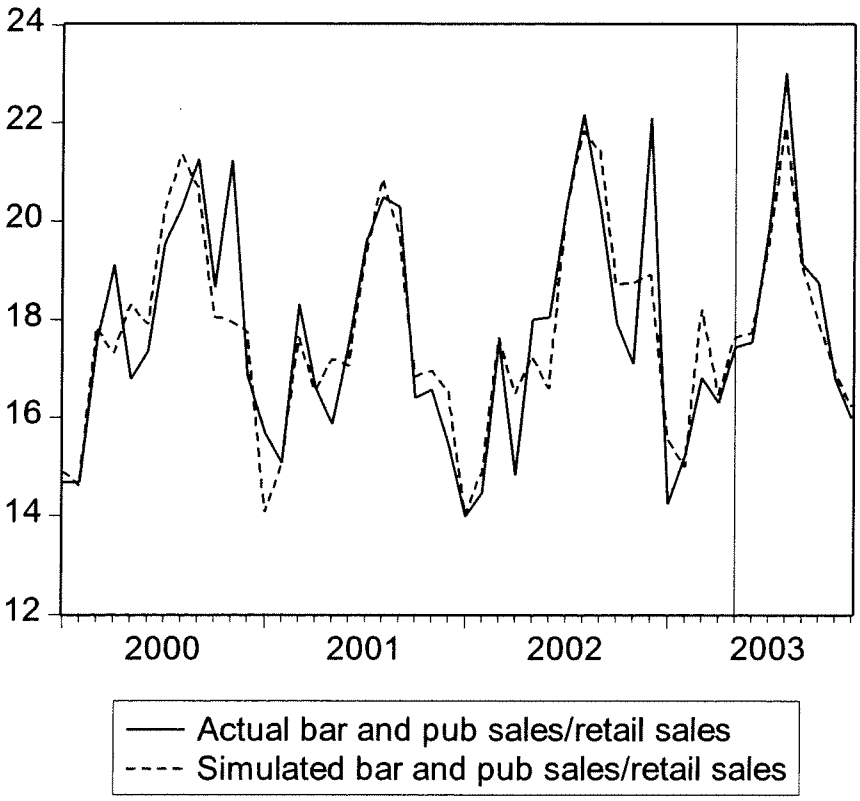
Until the imposition of the smoking ban, both the bar and pub sales and tax receipts followed the usual cyclical patterns during this period; higher in 2000, lower in 2001 and early 2002, and then a gradual recovery in late 2002 and early 2003. However, the gains came to an abrupt halt once the smoking ban was passed, and declined during the remainder of 2003.

Figure 9.2 Actual and Simulated Ratio of Tax Receipts to Retail Sales for Kingston



It is clear that the seasonal factors dominate the data for Kingston tax receipts; to a lesser extent, that is also true for the sales data. In this regression, it is obvious that the peak values in the summer of 2003 are well below those in previous years. The key economic variable in this equation is the change in the index of industrial production over the past six months.

Figure 9.3 Actual and Simulated Ratio of Bar and Pub Sales to Retail Sales for Kingston



This graph looks somewhat unusual because at first glance it appears that sales at pubs and bars rose for a few months after the smoking ban before declining sharply. For the most part that is due to the seasonal factors; a similar pattern can be observed in 2000, 2001, and 2002. It is situations of this sort that show why we start each section off with a graph of the deseasonalized data. Referring back to Figure 9.1, it can be seen that while there is a slight spike in sales in August, most of the observations after May are below their 2002 levels .

The key economic variables in this equation, in addition to the change in industrial production, is the upward trend of overall retail sales in Kingston, used with a six-month moving average. As the economy improves, it is likely that bar and pub sales would rise more rapidly than overall retail sales in the absence of a smoking ban, so the fact that the observed decline is not even larger represents the overall improvement of the Kingston economy.

10. Regression Equations and Results for Kitchener, Ontario

From an econometric viewpoint, the Kitchener results pose the opposite problem as those in London and Kingston. Instead of the smoking ban appearing very late in the sample period, the Kitchener ban went into effect in the first month of the sample period, so from an econometric viewpoint it was active for all 48 observations. In such a case it would be econometrically impossible to determine the value of the parameter. For that reason, a different approach was used, which was to insert the first difference of that variable over a six-month period. Hence we are in effect stating that tax receipts and bar and pub sales dropped significantly during the first six months of the ban.

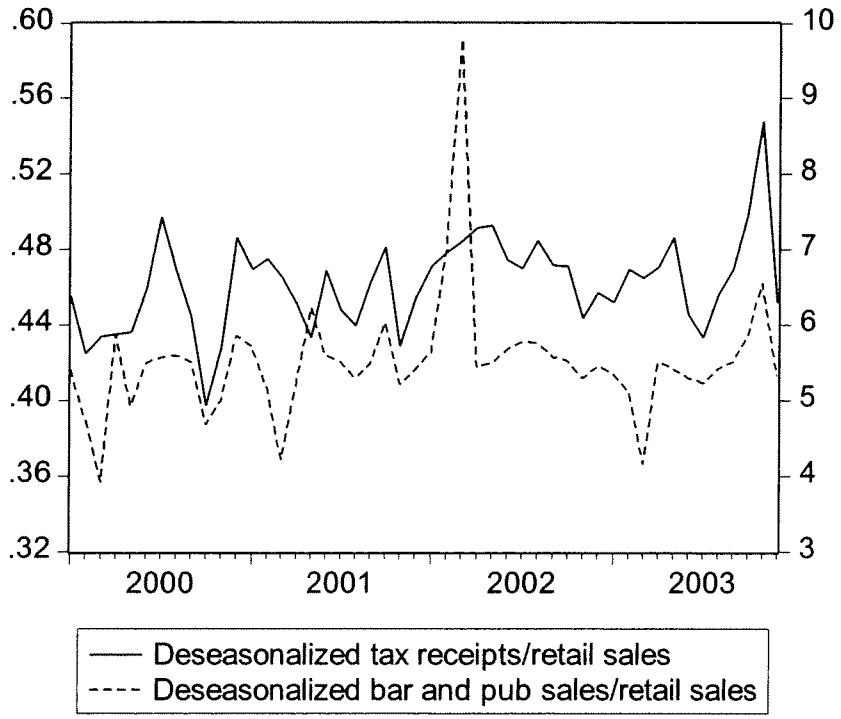
Table 10. Key parameters in regression equations for Kitchener

Equations for Kitchener

Dependent Variable	Intro of Smoking Ban	Value of Canadian Dollar	Industrial Production	Unempl Rate	Retail Sales Trend	Adjusted R-Square D-W stat
TAXES						
Coeff	-0.028					0.584
T-statistic	2.2					1.33
Elas, %	**7.3**					
Form	Difference					
Lag if any	0,6					
Coeff	-0.037		0.0082			0.659
T-statistic	3.1		3.0			1.63
Elas, %	**9.5**					
Form	Difference		% Chg			
Lag if any	0,6		0,6			
SALES						
Coeff	-0.752					0.223
T-statistic	1.9					1.62
Elas, %	**15.6**					
Form	Difference					
Lag if any	0,6					
Coeff	-0.987		0.261			0.340
T-statistic	2.7		2.9			1.83
Elas, %	**20.4**					
Form	Difference		% Chg			
Lag if any	0,6		0,3			

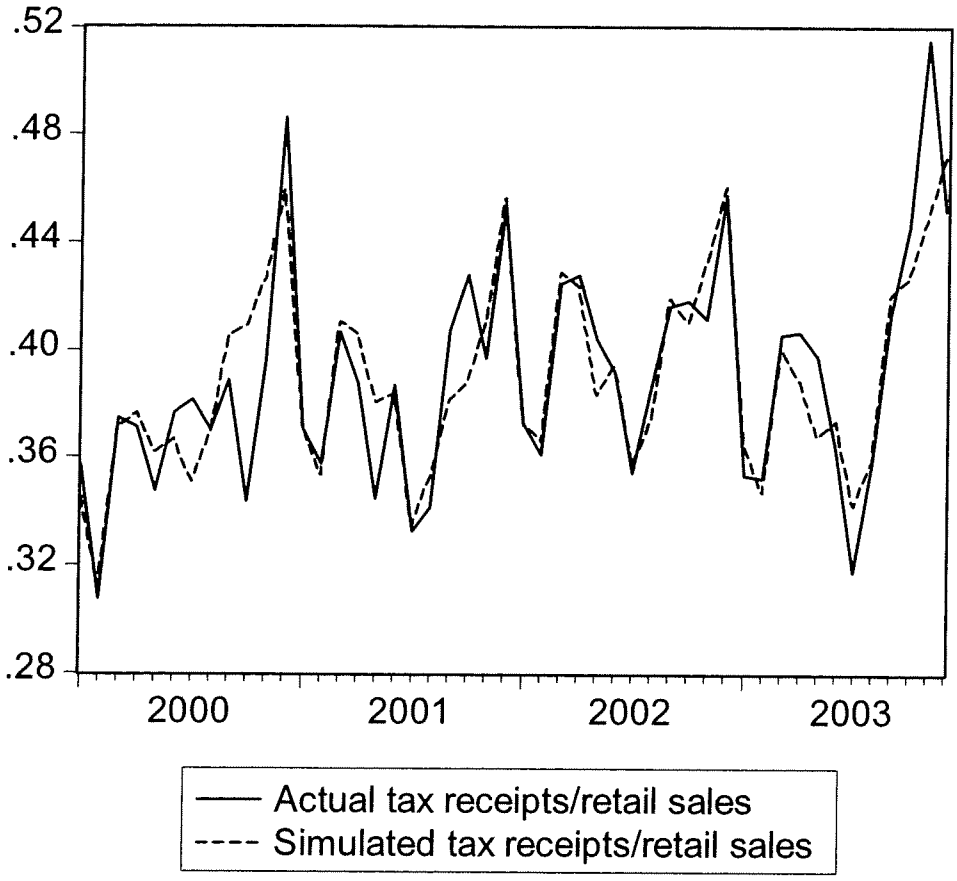
The results in Table 10 using this approach indicate that was indeed the case for sales, with a reduction of 20.4%; here again, the value obtained from the tax receipts data are far smaller, being estimated at 9.5%. Since the imposition of the smoking ban is coincident with the beginning of the sample period, the three graphs in this section have no vertical line indicating the date at which the ban became effective; otherwise they are directly comparable with the graphs in the previous sections of this report.

Figure 10.1. Deseasonalized ratios of bar and pub sales and tax receipts relative to total retail sales for Kitchener



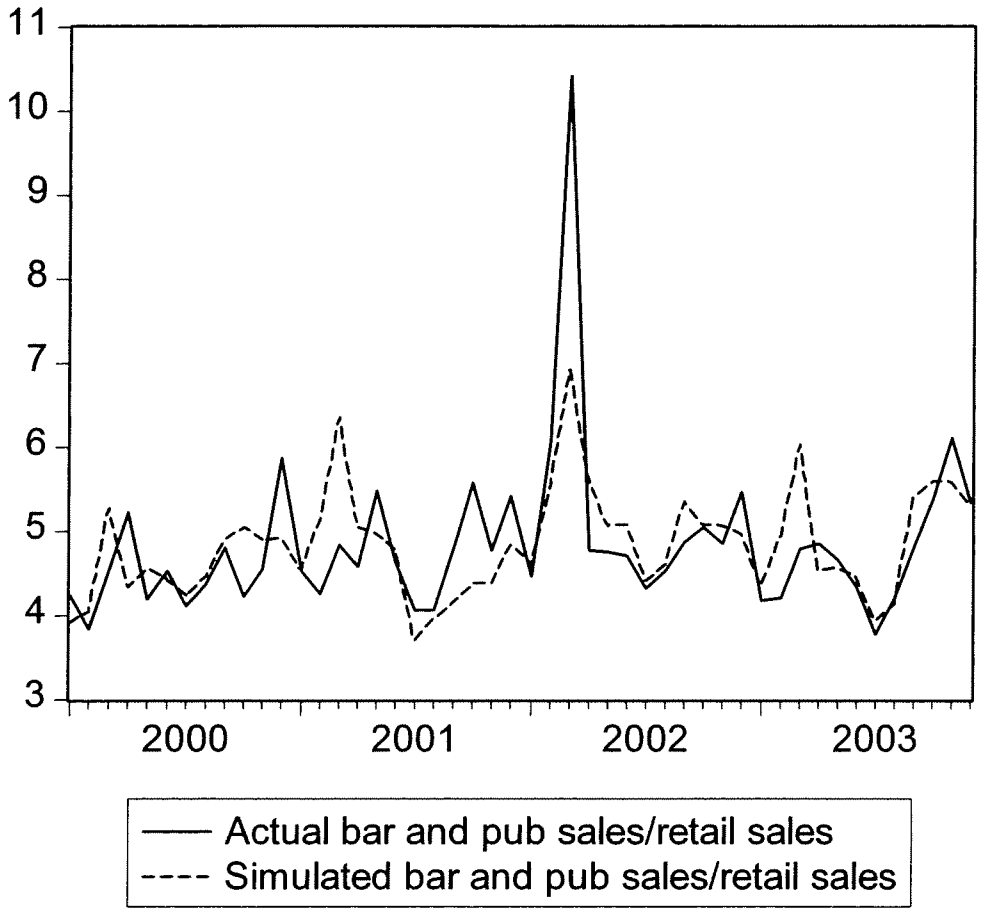
The main point to observe in this graph is the fairly sharp decline in tax receipts and bar and pub sales early in 2000, just after the ban was imposed. The pickup later in the year represents the strong economy in 2000, just as the gradual decline 2001 and 2002 (except for yet another spike in the sales data) reflects the slowdown in economic activity, followed by an improvement in 2003.

Figure 10.2 Actual and Simulated Ratio of Tax Receipts to Retail Sales for Kitchener



In both the tax receipts and bar and pub sales equations, the key economic variable is the percentage change in the index of industrial production. Both data series appear to have unusual patterns; the tax data drops very sharply in mid-2003 and then rebounds quickly, while the sales data has a spike in March 2002. Both series, however, do show a significant rebound in the latter half of 2003, representing the improved economy – and indicating what might have happened in London and Kingston had a smoking ban not been imposed during that period.

Figure 10.3 Actual and Simulated Ratio of Bar and Pub Sales to Retail Sales for Kitchener



Appendix A. Actual data used in all regression equations.

All the data used in the actual regression equations is provided in this appendix except for the dummy variables, which are either 0 or 1, and the seasonal dummy variables

A brief comment about the data for total retail sales in each of the regions is in order. As noted in the body of the report, only annual data were available from the Ministry of Finance for these various municipalities, but even those were not available for 2003. Hence a two-step procedure was necessary to generate monthly series. First, data for monthly total retail sales for Ontario was obtained from Statistics Canada for 1999 through 2003. Second, the Ministry of Finance provided annual data on sales, income, and employment for Ottawa, London, Kingston, Kitchener, and the province of Ontario on an annual basis from 1999 through 2002. We then generated the 2003 annual figures using the change in employment by metropolitan areas taken from the Table 9.10 of the Market Research Handbook. These figures were compared to the changes in employment in 1999-2002 for the various locations, and were adjusted where appropriate by changes in sales and income. Since these variables are used in the equations to measure the overall trend in retail sales in a given location, monthly changes are not as critical as they would be for other variables.

The data are now given in separate spreadsheets for (a) each of the 7 regions, and (b) the overall economic data. All series are given for 2000-2003 except for the economic data, which are given for 1999-2003 because of the frequent use of lags.

Data for Main Downtown Ottawa (Ottawa A)

	Tax Receipts	Bar & Pub Sales	Tot Ret Sales (/1000)
2000.01	204590.8	2341920	246497.4
2000.02	225363.5	5448428	246204.1
2000.03	261213.9	3511965	251900.7
2000.04	272462.7	3155286	247480
2000.05	318676.1	3650663	251586.7
2000.06	336100.3	4284911	253540.9
2000.07	382595	4405516	256478.3
2000.08	362837	4101538	256355.3
2000.09	330957.7	4469054	260834.8
2000.10	291606.4	3334151	258947.7
2000.11	240772.7	2713435	258458
2000.12	264534.6	3327634	257879.7
2001.01	206085	2362326	259941.7
2001.02	240312.5	2737485	258224.1
2001.03	286126.6	3950702	258045.3
2001.04	297178.7	3400895	263433.8
2001.05	352770.5	4031470	263468.6

2001.06	383157.6	4381321	262570
2001.07	413681.8	4692866	259147.2
2001.08	356729.6	4230751	261613.2
2001.09	343516.4	4849515	256641.2
2001.10	291359.3	3204306	262350.6
2001.11	262964.2	2971066	268256.5
2001.12	264318.6	3004180	273943.1
2002.01	216790.3	2507614	281365.1
2002.02	237061.6	2739799	272347.7
2002.03	290112.6	3935318	277187.6
2002.04	299996.4	3394375	279655.2
2002.05	345212.1	4011420	270755.9
2002.06	330076.7	4021986	280096.2
2002.07	385539.6	4468946	280297.9
2002.08	393636.2	4511775	280628.3
2002.09	350518.1	4799950	280341.7
2002.10	304944.2	3479266	285302.5
2002.11	284234.1	3854906	284393.3
2002.12	281469	3195704	286608.9
2003.01	223840.1	2583858	287684.2
2003.02	248935.6	2881392	290351.1
2003.03	285291.5	4027002	289872.9
2003.04	297618.2	3385920	288587.6
2003.05	375844.1	9030592	290170.7
2003.06	383523.8	5759135	289420.7
2003.07	397591	4473046	295306.7
2003.08	366611.7	4247014	298066.3
2003.09	335812.8	4615943	296774.6
2003.10	322515.4	3726830	294914.2
2003.11	285263.9	3784025	292550.9
2003.12	291300.4	3387415	288323.9

Data for Other Downtown Ottawa (Ottawa B)

	Tax Receipts	Bar & Pub Sales	Tot Ret Sales (/1000)
2000.01	280777.2	3177224	250122.4
2000.02	281891.3	3972195	249824.8
2000.03	313460.2	3574342	255605.1
2000.04	293421.7	3342113	251119.4
2000.05	324703.6	3724909	255286.5
2000.06	334574.1	3860653	257269.5
2000.07	319824	3679888	260250.1
2000.08	317018.1	3643874	260125.2
2000.09	311917.4	3624777	264670.6
2000.10	326667.8	4601953	262755.8
2000.11	327874.2	3877691	262258.8

2000.12	358721.6	4856446	261672.1
2001.01	302386.5	4208729	263764.3
2001.02	316648.5	4430541	262021.5
2001.03	374866.7	5002280	261840.1
2001.04	345544.1	3995099	267307.8
2001.05	363451.3	4178335	267343.2
2001.06	362612.9	4128476	266431.3
2001.07	316512.1	3663824	262958.2
2001.08	325192.9	3740881	265460.5
2001.09	335633.4	3837269	260415.4
2001.10	335217	3891377	266208.7
2001.11	347911.8	4012792	272201.4
2001.12	360863.1	4152110	277971.7
2002.01	294337.2	3412153	285502.8
2002.02	307856.1	3408846	276352.8
2002.03	337170.7	3740522	281263.9
2002.04	341057.2	3898261	283767.8
2002.05	336981.6	3811945	274737.6
2002.06	362571.7	4137056	284215.2
2002.07	332601.8	3839075	284420
2002.08	329190.8	3748228	284755.2
2002.09	319319.3	3740847	284464.3
2002.10	327256.7	3794098	289498.2
2002.11	313751.1	3731057	288575.6
2002.12	319939.1	3686532	290823.7
2003.01	286503	4137505	291914.9
2003.02	290216.5	3350805	294621
2003.03	326864.4	6801727	294135.7
2003.04	326000.8	3668666	292831.5
2003.05	368868	4236235	294437.9
2003.06	335465.7	3851330	293676.9
2003.07	329119.9	3745175	299649.4
2003.08	301167.1	3424361	302449.6
2003.09	300227.5	3438056	301138.9
2003.10	320487.4	3666949	299251.1
2003.11	306471.9	3539092	296853.2
2003.12	315569.9	3626530	292564

Data for West side residential Ottawa
(Ottawa C)

	Tax Receipts	Bar & Pub Sales	Tot Ret Sales (/1000)
2000.01	278405.1	3624653	187591.8
2000.02	205520.3	2559039	187368.6
2000.03	230197.9	3078013	191703.8
2000.04	230885.4	3656827	188339.6
2000.05	236158.4	2816093	191464.9
2000.06	259618.6	3148615	192952.1

2000.07	261832.8	4159764	195187.6
2000.08	274506.5	3496535	195093.9
2000.09	256946.7	3041560	198503
2000.10	248946.2	3383703	197066.8
2000.11	227852.6	2743578	196694.1
2000.12	327003.4	4252974	196254.1
2001.01	222974.5	2840036	197823.2
2001.02	216638.4	2826941	196516.1
2001.03	252069.5	2968456	196380.1
2001.04	234940.8	3102700	200480.9
2001.05	238224.5	2823531	200507.4
2001.06	275315.6	3515239	199823.5
2001.07	249635.5	2951797	197218.6
2001.08	241152.9	3278850	199095.3
2001.09	243225	3017794	195311.5
2001.10	206452	2917869	199656.5
2001.11	205660.8	2563437	204151.1
2001.12	280431.9	3733378	208478.8
2002.01	189055.9	2389745	214127.1
2002.02	190863.3	2461177	207264.6
2002.03	210540.7	2676830	210947.9
2002.04	221664.4	2797241	212825.8
2002.05	141816.5	1812505	206053.2
2002.06	312351.2	3899683	213161.4
2002.07	244117.1	3051373	213315
2002.08	247103.9	3032759	213566.4
2002.09	223086.3	2798297	213348.3
2002.10	202855.3	2548620	217123.6
2002.11	185909.2	2392675	216431.7
2002.12	185519.4	2531487	218117.8
2003.01	175854.4	2232578	218936.2
2003.02	165957.8	1980105	220965.8
2003.03	269811.5	3406227	220601.8
2003.04	157235.9	2031575	219623.6
2003.05	156205.3	1989406	220828.4
2003.06	165323.1	1987964	220257.7
2003.07	157623.6	1955885	224737.1
2003.08	335092.7	4077427	226837.2
2003.09	244034.5	3000219	225854.2
2003.10	224870.9	2742697	224438.3
2003.11	223389.2	2721135	222639.9
2003.12	226357.3	2824412	219423

Data for Eastside Residential Ottawa
(Ottawa D)

	Tax Receipts	Bar & Pub Sales	Tot Ret Sales (/1000)

2000.01	205977.1	2484412	149529.7
2000.02	162786.2	2008086	149351.8
2000.03	131598.2	1511812	152807.4
2000.04	239090.5	2894150	150125.7
2000.05	178248	2123832	152616.9
2000.06	189824.8	2304988	153802.4
2000.07	191831.6	2320301	155584.3
2000.08	190583.5	2297550	155509.6
2000.09	186974.8	2221145	158227
2000.10	186295.8	2275779	157082.3
2000.11	187580.2	2253799	156785.2
2000.12	178683.7	2152439	156434.4
2001.01	175810.5	2112293	157685.2
2001.02	167539.7	2025870	156643.3
2001.03	200847.5	2409373	156534.9
2001.04	244650.1	2927736	159803.6
2001.05	203026.9	2432027	159824.7
2001.06	211693	2546030	159279.6
2001.07	203840.5	2440680	157203.3
2001.08	203067.2	2443529	158699.2
2001.09	190861.7	2304189	155683.1
2001.10	181456.4	2235932	159146.5
2001.11	189915.5	2676827	162729.1
2001.12	193164.8	2339391	166178.7
2002.01	180325.6	2163415	170681
2002.02	166960.7	2027761	165210.9
2002.03	238253.2	2876633	168146.9
2002.04	135784.9	1711716	169643.8
2002.05	179379.1	2257600	164245.3
2002.06	257726.4	3081669	169911.3
2002.07	191769	2327340	170033.7
2002.08	191951.5	2335394	170234.1
2002.09	188808.5	2266665	170060.2
2002.10	173309.2	2205347	173069.6
2002.11	134643.5	1626782	172518
2002.12	135516.6	2544833	173862
2003.01	176563.2	2965212	174514.3
2003.02	161735.1	1969581	176132.1
2003.03	236806.5	2889831	175842
2003.04	179036.6	2454204	175062.3
2003.05	192621.7	2338323	176022.7
2003.06	192809.8	2349273	175567.7
2003.07	190734.4	2300189	179138.2
2003.08	179879	2173511	180812.3
2003.09	177732	2771862	180028.7
2003.10	178528.9	2184385	178900.1
2003.11	178366.3	2176397	177466.6
2003.12	176562.2	2152631	174902.4

Data for London

	Tax Receipts	Bar & Pub Sales	Tot Ret Sales (/1000)
2000.01	257172.5	2911964	340746.4
2000.02	256929.9	2970647	340341
2000.03	305608.5	3480841	348215.7
2000.04	297315	3412795	342104.7
2000.05	270293.8	2981790	347781.6
2000.06	291125.8	3544810	350483.1
2000.07	302056.7	3518241	354543.6
2000.08	283003.1	3254102	354373.5
2000.09	333389.4	3711335	360565.7
2000.10	308045.4	3469037	357957.2
2000.11	304312.9	3364504	357280.1
2000.12	331688.2	3924458	356480.8
2001.01	277943.2	3136388	359331.1
2001.02	280284.7	3164274	356956.8
2001.03	330746.3	3821636	356709.7
2001.04	311017.4	3476384	364158.5
2001.05	294229.6	3389526	364206.6
2001.06	347215.2	4177644	362964.3
2001.07	318146.2	3731133	358232.9
2001.08	329207	3717974	361641.8
2001.09	346809.4	4057603	354768.8
2001.10	298929.2	3390249	362661.1
2001.11	323315.2	3665691	370825.2
2001.12	346414.1	4004644	378686
2002.01	275346.7	3086132	388945.9
2002.02	289571.7	3203523	376480.6
2002.03	352304.8	3889371	383171.2
2002.04	298556.7	3335752	386582.2
2002.05	307256.8	3435296	374280.2
2002.06	347890.7	3938855	387191.7
2002.07	320487.6	3566890	387470.7
2002.08	351951.8	3930619	387927.3
2002.09	352438.4	3980573	387531.1
2002.10	312914.5	3482016	394388.8
2002.11	330192.3	5024156	393132
2002.12	338806.7	3880142	396194.7
2003.01	282755.8	3146788	397681.1
2003.02	271102.5	3071930	401367.7
2003.03	312067.4	3524702	400706.6
2003.04	291819.6	3225503	398929.9
2003.05	317367	3513704	401118.3
2003.06	331568.9	3746703	400081.6
2003.07	305351.5	3396985	408218
2003.08	333667.4	3930338	412032.8

2003.09	331276.3	3726515	410247.2
2003.10	303392	3728760	407675.5
2003.11	316369.2	3571305	404408.6
2003.12	298995.9	3383640	398565.4

Data for Kingston

	Tax Receipts	Bar & Pub Sales	Tot Ret Sales (/1000)
2000.01	139080.1	1679726	114438.7
2000.02	139651.4	1677475	114283.2
2000.03	182355.5	2054300	116907.5
2000.04	180915.1	2193362	114836.4
2000.05	165522.5	1959626	116722.1
2000.06	171240.5	2038810	117608.8
2000.07	193945.9	2324465	118951.1
2000.08	201945.7	2411143	118873.9
2000.09	217079.3	2570703	120930.5
2000.10	190571.9	2236738	120035.2
2000.11	167058.4	2543202	119787.8
2000.12	169104.5	2014390	119499.5
2001.01	159478.4	1887611	120434.6
2001.02	153387.4	1801784	119618.5
2001.03	186171.9	2187391	119515.3
2001.04	165138.8	2024795	121990.3
2001.05	162843.3	1934039	121985.7
2001.06	178229.9	2129323	121549
2001.07	196143.8	2348095	119944.1
2001.08	207819.8	2480433	121064.9
2001.09	200529.1	2408489	118743.9
2001.10	168299.7	1990775	121364.9
2001.11	172797.4	2053638	124075.9
2001.12	162586.4	1961544	126684.6
2002.01	150327.8	1816573	130094.8
2002.02	153776.3	1821373	125904
2002.03	185917.6	2251930	128119.7
2002.04	168493.2	1914823	129238.3
2002.05	187935.1	2249003	125104.4
2002.06	193432.4	2332933	129398.1
2002.07	215716.6	2627066	129469.4
2002.08	233757.3	2872552	129599.9
2002.09	220102.8	2629461	129445.6
2002.10	198476.5	2358473	131713.8
2002.11	189337.2	2243056	131271.8
2002.12	174779	2921886	132272
2003.01	160347.7	1888558	132745.7
2003.02	153543.5	2040892	133953.5
2003.03	184348.7	2245935	133710.1

2003.04	181993.9	2168859	133094.6
2003.05	193215.1	2332887	133802
2003.06	192784	2338346	133433.6
2003.07	220397.5	2703499	136124
2003.08	235514.1	3162099	137372.8
2003.09	215982	2616031	136754.2
2003.10	208225.3	2546190	135873.8
2003.11	186656.5	2260539	134762.2
2003.12	171787.2	2123303	132792.4

Data for Kitchener

	Tax Receipts	Bar & Pub Sales	Tot Ret Sales (/1000)
2000.01	117329	1394102	328883.1
2000.02	100978.5	1258374	328409.8
2000.03	125887.8	1522269	335924.4
2000.04	122527.4	1719469	329946.7
2000.05	116540.2	1401005	335338.1
2000.06	127261.1	1530382	337858.4
2000.07	130228.7	1402402	341687.3
2000.08	126338.9	1487308	341438
2000.09	135043.2	1667454	347317.5
2000.10	118481.2	1451476	344718.6
2000.11	136141.7	1560637	343980.6
2000.12	166883.9	2010028	343125.3
2001.01	128196.4	1562703	345782.4
2001.02	122840.9	1459232	343411.8
2001.03	139402.5	1658516	343088.4
2001.04	135771	1603663	350165.2
2001.05	120574	1915082	350124
2001.06	134831.3	1612101	348842.6
2001.07	114383.6	1395393	344209.2
2001.08	118600.5	1411982	347397.8
2001.09	138651	1629390	340710.4
2001.10	148940.7	1938408	348202.9
2001.11	141208.1	1693865	355952.6
2001.12	164811.9	1964132	363407.4
2002.01	139030.3	1665015	373160
2002.02	130457.6	2195552	361110.4
2002.03	156000.9	3824984	367436
2002.04	158562.4	1767882	370614.3
2002.05	144950.5	1701640	358730.8
2002.06	145354.7	1744589	371013.3
2002.07	131526.6	1603761	371187.8
2002.08	143426.6	1680914	371532.4
2002.09	154395.6	1804932	371060.2
2002.10	157780.3	1905474	377532.1

2002.11	154765.7	1822564	376234.9
2002.12	173232.4	2067615	379071.3
2003.01	134415.9	1587734	380398.4
2003.02	135169.9	1611024	383828.9
2003.03	155324.9	1829488	383101
2003.04	155035.9	1847921	381307
2003.05	152390.5	1786615	383303
2003.06	138889.6	1655729	382216.8
2003.07	123803.5	1468641	389892.5
2003.08	140668.7	1651776	393437.7
2003.09	161955	1879023	391634.8
2003.10	173398.6	2085112	389082.5
2003.11	198937.1	2353561	385868.2
2003.12	171893.1	2028882	380197.9

Economic Data

	Value of U.S. $/ Canada $	Index of Industrial Production	Rate of Unempl-oyment
1999.01	1.519	106.9	7.2
1999.02	1.498	106.7	7.2
1999.03	1.518	107.1	7.2
1999.04	1.488	107.3	7.1
1999.05	1.461	107.6	7.1
1999.06	1.470	108.7	7.1
1999.07	1.489	109.9	6.7
1999.08	1.493	111.0	6.7
1999.09	1.477	111.6	6.7
1999.10	1.478	111.2	6.2
1999.11	1.467	112.1	6.2
1999.12	1.472	112.8	6.2
2000.01	1.449	113.8	6.1
2000.02	1.451	112.6	6.1
2000.03	1.461	113.5	6.1
2000.04	1.469	115.6	6.1
2000.05	1.496	115.3	6.1
2000.06	1.477	115.6	6.1
2000.07	1.478	115.4	6.1
2000.08	1.483	116.0	6.1
2000.09	1.486	115.5	6.1
2000.10	1.513	116.0	6.1
2000.11	1.543	115.8	6.1
2000.12	1.522	115.5	6.1
2001.01	1.503	117.1	6.2
2001.02	1.522	116.8	6.2
2001.03	1.559	116.5	6.2
2001.04	1.558	117.7	6.2
2001.05	1.541	117.0	6.3

2001.06	1.525	115.8	6.3
2001.07	1.531	115.2	6.4
2001.08	1.540	115.3	6.5
2001.09	1.568	112.4	6.6
2001.10	1.572	112.8	6.7
2001.11	1.592	112.9	6.9
2001.12	1.579	112.0	7.1
2002.01	1.600	114.1	7.1
2002.02	1.596	115.6	7.1
2002.03	1.588	115.5	7.0
2002.04	1.582	117.1	6.9
2002.05	1.550	116.2	6.9
2002.06	1.532	116.2	7.0
2002.07	1.546	117.8	7.0
2002.08	1.569	117.5	7.0
2002.09	1.576	118.1	7.0
2002.10	1.578	118.5	7.0
2002.11	1.572	118.1	6.9
2002.12	1.559	118.3	6.8
2003.01	1.541	118.8	6.7
2003.02	1.512	118.2	6.7
2003.03	1.476	118.0	6.7
2003.04	1.458	117.0	6.8
2003.05	1.384	116.6	6.9
2003.06	1.353	115.8	7.0
2003.07	1.382	115.6	7.2
2003.08	1.396	115.8	7.2
2003.09	1.363	117.9	7.2
2003.10	1.322	118.6	7.0
2003.11	1.313	118.7	6.8
2003.12	1.313	119.7	6.6

Appendix B. Regression Equations

The nomenclature is similar for all equations. In general:

In the dependent variable, the numerator is either tax receipts or sales receipts from bars and pubs in the designated region. The denominator is retail sales (as discussed in Appendix A) for that region.

@SEAS are the seasonal dummy variables for months 1 through 12. In general, seasonal terms with t-ratios less than unity are omitted. DSPRING is the seasonal dummy variable for changing spring patterns used in Ottawa D.

The other "D" variables represent the imposition of the smoking ban. The variable is 1 during the period the ban was in effect and 0 before it became effective.

For the economic variables:

FXCAN is the number of Canadian dollars per U.S. dollar

CANXIP is the Canadian index of industrial production

UN is the Canadian unemployment rate

XXXSAL is total retail sales for the region, where XXX is the specific designation for the region. These are OTTA, OTTB, OTTC, OTTD for the four districts of Ottawa, and LOND, KING, and KITCH for London, Kingston, and Kitchener

In many cases the economic variables are lagged. For moving average percentage changes, the first number indicates the beginning lag, and the second variable is the length of lag. For example, @PCH(FXCAN(-3),3) indicates the percentage change in the values of the Canadian dollar from 3 months ago to 6 months ago.

In general, the smoking ban variables enters the equation through a distributed lag. The precise lag distribution is then given at the bottom of each table.

Equations for the Main Downtown Region of Ottawa (Region A)

1A. Tax Receipts, no economic variables

Dependent Variable: MAINOTTAWATAX/OTTASAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic
C	1.030	0.022	47.24
@SEAS(1)	-0.205	0.033	-6.26
@SEAS(2)	-0.103	0.033	-3.15
@SEAS(3)	0.048	0.033	1.47
@SEAS(4)	0.087	0.033	2.67
@SEAS(5)	0.298	0.033	9.11
@SEAS(6)	0.326	0.033	9.97
@SEAS(7)	0.457	0.033	13.96
@SEAS(8)	0.357	0.033	10.91
@SEAS(9)	0.256	0.033	7.83
@SEAS(10)	0.112	0.033	3.43
PDL01	-0.010	0.002	-4.22

R-squared	0.948	Mean dependent var	1.129
Adjusted R-squared	0.932	S.D. dependent var	0.204
Durbin-Watson stat	1.37		

Lag Distribution of DOTTAWA	i	Coefficient	Std. Error	T-Statistic
* .|	0	-0.0171	0.0041	-4.22
* .|	1	-0.0147	0.0035	-4.22
* .|	2	-0.0122	0.0029	-4.22
* .|	3	-0.0098	0.0023	-4.22
* .|	4	-0.0073	0.0017	-4.22
* .|	5	-0.0049	0.0012	-4.22
* .|	6	-0.0024	0.0006	-4.22
	Sum of Lags	-0.0686	0.0163	-4.22

1B. Tax Receipts, economic variables

Dependent Variable: MAINOTTAWATAX/OTTASAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic
C	-0.394	0.576	-0.68
@SEAS(1)	-0.206	0.029	-7.13
@SEAS(2)	-0.100	0.029	-3.51
@SEAS(3)	0.057	0.029	1.98

@SEAS(4)	0.110	0.029	3.74
@SEAS(5)	0.330	0.030	10.95
@SEAS(6)	0.346	0.030	11.59
@SEAS(7)	0.472	0.030	15.83
@SEAS(8)	0.375	0.031	12.22
@SEAS(9)	0.292	0.032	9.22
@SEAS(10)	0.133	0.030	4.42
@PCH(FXCAN(-3),3)	0.010	0.003	3.31
D(UN)	-0.155	0.089	-1.74
@MOVAV(OTTASAL(-7),5)	0.002	0.001	2.20
@MOVAV(FXCAN(-6),6)	0.623	0.343	1.81
PDL01	-0.021	0.006	-3.80

R-squared	0.967	Mean dependent var	1.129
Adjusted R-squared	0.952	S.D. dependent var	0.205
Durbin-Watson stat	1.86		

Lag Distribution of DOTTAWA	i	Coefficient	Std. Error	T-Statistic
* .|	0	-0.0374	0.0098	-3.80
* .|	1	-0.0320	0.0084	-3.80
* .|	2	-0.0267	0.0070	-3.80
* .|	3	-0.0214	0.0056	-3.80
* .|	4	-0.0160	0.0042	-3.80
* .|	5	-0.0107	0.0028	-3.80
* .|	6	-0.0053	0.0014	-3.80
	Sum of Lags	-0.1496	0.0394	-3.80

1C. Sales, no economic variables

Dependent Variable: MAINOTTAWABARPUBSAL/OTTASAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic
C	12.573	0.859	14.64
@SEAS(1)	-3.274	1.642	-1.99
@SEAS(3)	1.950	1.641	1.19
@SEAS(5)	6.552	1.641	3.99
@SEAS(6)	4.576	1.641	2.79
@SEAS(7)	4.209	1.641	2.57
@SEAS(8)	3.239	1.641	1.97
@SEAS(9)	4.815	1.639	2.94
PDL01	-0.054	0.130	-0.41

R-squared	0.508	Mean dependent var	14.208
Adjusted R-squared	0.407	S.D. dependent var	3.884
Durbin-Watson stat	1.78		

Lag Distribution of	i	Coefficien	Std. Error	T-Statistic

DOTTAWA		t		
* .|	0	-0.094	0.227	-0.41
* .|	1	-0.081	0.195	-0.41
* .|	2	-0.067	0.162	-0.41
* .|	3	-0.054	0.130	-0.41
* .|	4	-0.040	0.097	-0.41
* .|	5	-0.027	0.065	-0.41
* .|	6	-0.013	0.032	-0.41
	Sum of Lags	-0.377	0.908	-0.41

1D. Sales, economic variables

Dependent Variable: MAINOTTAWABARPUBSAL/OTTASAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	
C	-73.465	40.806	-1.80	
@SEAS(1)	-3.959	1.569	-2.52	
@SEAS(5)	5.794	1.572	3.69	
@SEAS(6)	3.798	1.573	2.41	
@SEAS(7)	3.404	1.575	2.16	
@SEAS(8)	2.417	1.576	1.53	
@SEAS(9)	4.305	1.560	2.76	
@MOVAV(FXCAN(-6),12)	58.380	27.569	2.12	
PDL01	-0.650	0.305	-2.13	
R-squared	0.543	Mean dependent var		14.208
Adjusted R-squared	0.449	S.D. dependent var		3.884
Durbin-Watson stat	1.99			

Lag Distribution of DOTTAWA	i	Coefficient	Std. Error	T-Statistic
* .|	0	-1.137	0.533	-2.13
* .|	1	-0.975	0.457	-2.13
* .|	2	-0.812	0.381	-2.13
* .|	3	-0.650	0.305	-2.13
* .|	4	-0.487	0.228	-2.13
* .|	5	-0.325	0.152	-2.13
* .|	6	-0.162	0.076	-2.13
	Sum of Lags	-4.549	2.132	-2.13

Remaining Downtown Region of Ottawa (Ottawa B)

2A. Tax Receipts, no economic variables

Dependent Variable: OTHDTWNTAX/OTTBSAL
Method: Least Squares

Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic
C	1.251	0.017	71.59
@SEAS(1)	-0.117	0.036	-3.22
@SEAS(2)	-0.076	0.036	-2.09
@SEAS(3)	0.058	0.036	1.60
@SEAS(5)	0.094	0.036	2.59
@SEAS(6)	0.086	0.036	2.37
PDL01	-0.019	0.003	-6.51

R-squared	0.650	Mean dependent var	1.182
Adjusted R-squared	0.599	S.D. dependent var	0.107
Durbin-Watson stat	0.78		

Lag Distribution of DOTTAWA	i	Coefficient	Std. Error	T-Statistic
* .|	0	-0.0335	0.0051	-6.51
* .|	1	-0.0287	0.0044	-6.51
* .|	2	-0.0239	0.0037	-6.51
* .|	3	-0.0191	0.0029	-6.51
* .|	4	-0.0144	0.0022	-6.51
* .|	5	-0.0096	0.0015	-6.51
* .|	6	-0.0048	0.0007	-6.51
	Sum of Lags	-0.1340	0.0206	-6.51

2B. Tax Receipts, economic variables

Dependent Variable: OTHDTWNTAX/OTTBSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.336	0.177	1.90	
@SEAS(1)	-0.143	0.029	-4.95	
@SEAS(2)	-0.099	0.029	-3.45	
@SEAS(3)	0.040	0.029	1.38	
@SEAS(5)	0.079	0.029	2.77	
@SEAS(6)	0.077	0.028	2.70	
@MOVAV(FXCAN(-1),3)	0.614	0.119	5.18	
PDL01	-0.020	0.002	-8.74	

R-squared	0.790	Mean dependent var	1.182
Adjusted R-squared	0.754	S.D. dependent var	0.107
Durbin-Watson stat	1.20		

Lag Distribution of DOTTAWA	i	Coefficient	Std. Error	T-Statistic
* .|	0	-0.0353	0.0040	-8.74
* .|	1	-0.0303	0.0035	-8.74
* .|	2	-0.0252	0.0029	-8.74
* .|	3	-0.0202	0.0023	-8.74
* .|	4	-0.0151	0.0017	-8.74
* .|	5	-0.0101	0.0012	-8.74
* .|	6	-0.0050	0.0006	-8.74
	Sum of Lags	-0.1414	0.0162	-8.74

2C. Sales, no economic variables

Dependent Variable: OTHDTWNBARPUBSAL/OTTBSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic
C	14.572	0.432	33.71
@SEAS(3)	3.761	0.933	4.03
@SEAS(5)	1.003	0.933	1.08
@SEAS(10)	0.977	0.934	1.05
@SEAS(12)	1.400	0.937	1.49
@SEAS(6)	0.926	0.933	0.99
PDL01	-0.273	0.076	-3.60

R-squared	0.427	Mean dependent var	14.210
Adjusted R-squared	0.344	S.D. dependent var	2.153
Durbin-Watson stat	1.96		

Lag Distribution of DOTTAWA	i	Coefficient	Std. Error	T-Statistic
* .|	0	-0.478	0.133	-3.60
* .|	1	-0.409	0.114	-3.60
* .|	2	-0.341	0.095	-3.60
* .|	3	-0.273	0.076	-3.60
* .|	4	-0.205	0.057	-3.60
* .|	5	-0.136	0.038	-3.60
* .|	6	-0.068	0.019	-3.60
	Sum of Lags	-1.910	0.531	-3.60

2D. Sales, economic variables

Dependent Variable: OTHDTWNBARPUBSAL/OTTBSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic
C	-38.294	19.635	-1.95

@SEAS(3)	3.840	0.874	4.39
@SEAS(5)	1.008	0.872	1.16
@SEAS(6)	0.976	0.878	1.11
@SEAS(10)	0.928	0.873	1.06
@SEAS(12)	1.363	0.876	1.56
FXCAN	5.840	3.091	1.89
@MOVAV(CANXIP,6)	0.383	0.159	2.41
PDL01	-0.335	0.078	-4.30

R-squared	0.525	Mean dependent var	14.210
Adjusted R-squared	0.428	S.D. dependent var	2.153
Durbin-Watson stat	2.38		

Lag Distribution of DOTTAWA	i	Coefficient	Std. Error	T-Statistic
* .|	0	-0.586	0.136	-4.30
* .|	1	-0.502	0.117	-4.30
* .|	2	-0.418	0.097	-4.30
* .|	3	-0.335	0.078	-4.30
* .|	4	-0.251	0.058	-4.30
* .|	5	-0.167	0.039	-4.30
* .|	6	-0.084	0.019	-4.30
	Sum of Lags	-2.343	0.545	-4.30

3. Equations for part of residential Ottawa west of Rideau River (Ottawa C)

3A. Tax Receipts, no economic variables

Dependent Variable: OTTAWACTAX/OTTCSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic
C	1.259	0.041	30.98
@SEAS(2)	-0.139	0.086	-1.61
@SEAS(5)	-0.150	0.086	-1.74
@SEAS(12)	0.180	0.087	2.07
@SEAS(6)	0.130	0.086	1.51
@SEAS(8)	0.209	0.086	2.41
PDL01	-0.044	0.007	-6.28

R-squared	0.583	Mean dependent var	1.111
Adjusted R-squared	0.522	S.D. dependent var	0.234
Durbin-Watson stat	1.96		

Lag Distribution of DOTTAWA	i	Coefficient	Std. Error	T-Statistic
* .|	0	-0.077	0.012	-6.28
* .|	1	-0.066	0.011	-6.28
* .|	2	-0.055	0.009	-6.28
* .|	3	-0.044	0.007	-6.28
* .|	4	-0.033	0.005	-6.28
* .|	5	-0.022	0.004	-6.28

* .|	6	-0.011	0.002	-6.28
	Sum of Lags	-0.309	0.049	-6.28

3B. Tax receipts, economic variables

Dependent Variable: OTTAWACTAX/OTTCSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	
C	1.240	0.039	32.02	
@SEAS(2)	-0.140	0.082	-1.70	
@SEAS(5)	-0.147	0.081	-1.82	
@PCH(FXCAN(-1),1)	2.965	1.722	1.72	
@SEAS(12)	0.156	0.083	1.88	
@SEAS(6)	0.185	0.085	2.19	
@SEAS(8)	0.193	0.084	2.30	
@PCH(CANXIP,3)	0.0292	0.0161	1.82	
PDL01	-0.041	0.007	-5.69	
R-squared	0.651	Mean dependent var		1.111
Adjusted R-squared	0.580	S.D. dependent var		0.234
Durbin-Watson stat	2.26			

Lag Distribution of DOTTAWA	i	Coefficient	Std. Error	T-Statistic
* .|	0	-0.071	0.013	-5.69
* .|	1	-0.061	0.011	-5.69
* .|	2	-0.051	0.009	-5.69
* .|	3	-0.041	0.007	-5.69
* .|	4	-0.031	0.005	-5.69
* .|	5	-0.020	0.004	-5.69
* .|	6	-0.010	0.002	-5.69
	Sum of Lags	-0.286	0.050	-5.69

3C. Sales, no economic variables

Dependent Variable: OTTAWACBARPUBSAL/OTTCSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	
C	17.031	0.537	31.72	
@SEAS(2)	-2.677	1.226	-2.18	
@SEAS(5)	-3.209	1.226	-2.62	
PDL01	-0.621	0.101	-6.15	
R-squared	0.516	Mean dependent var		14.186
Adjusted R-squared	0.483	S.D. dependent var		3.249
Durbin-Watson stat	2.324			

Lag Distribution of DOTTAWA	i	Coefficient	Std. Error	T-Statistic
* .|	0	-1.087	0.177	-6.15
* .|	1	-0.931	0.151	-6.15
* .|	2	-0.776	0.126	-6.15
* .|	3	-0.621	0.101	-6.15
* .|	4	-0.466	0.076	-6.15
* .|	5	-0.310	0.050	-6.15
* .|	6	-0.155	0.025	-6.15
	Sum of Lags	-4.347	0.707	-6.15

3D. Sales, economic variables

Dependent Variable: OTTAWACBARPUBSAL/OTTCSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	
C	16.664	0.535	31.14	
@SEAS(2)	-2.440	1.177	-2.07	
@SEAS(5)	-3.302	1.176	-2.81	
@PCH(FXCAN(-1),1)	0.469	0.228	2.06	
@PCH(CANXIP,6)	0.232	0.155	1.50	
PDL01	-0.544	0.102	-5.32	
R-squared	0.579	Mean dependent var		14.186
Adjusted R-squared	0.529	S.D. dependent var		3.249
Durbin-Watson stat	2.467			

Lag Distribution of DOTTAWA	i	Coefficient	Std. Error	T-Statistic
* .|	0	-0.951	0.179	-5.32
* .|	1	-0.815	0.153	-5.32
* .|	2	-0.679	0.128	-5.32
* .|	3	-0.544	0.102	-5.32
* .|	4	-0.408	0.077	-5.32
* .|	5	-0.272	0.051	-5.32
* .|	6	-0.136	0.026	-5.32
	Sum of Lags	-3.805	0.715	-5.32

Equations for part of residential Ottawa east of Rideau River (Ottawa D)

4A. Tax Receipts, no economic variables

Dependent Variable: OTTAWADTAX/OTTDSAL
Method: Least Squares
Sample: 2000:01 2003:12

Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	
C	1.197	0.036	33.09	
@SEAS(3)	0.115	0.081	1.43	
@SEAS(4)	0.125	0.081	1.55	
@SEAS(6)	0.182	0.081	2.27	
PDL01	-0.024	0.007	-3.66	
R-squared	0.344	Mean dependent var		1.140
Adjusted R-squared	0.283	S.D. dependent var		0.180
Durbin-Watson stat	2.18			

Lag Distribution of DOTTAWA	i	Coefficient	Std. Error	T-Statistic
* .|	0	-0.042	0.012	-3.66
* .|	1	-0.036	0.010	-3.66
* .|	2	-0.030	0.008	-3.66
* .|	3	-0.024	0.007	-3.66
* .|	4	-0.018	0.005	-3.66
* .|	5	-0.012	0.003	-3.66
* .|	6	-0.006	0.002	-3.66
	Sum of Lags	-0.169	0.046	-3.66

4B. Tax Receipts, economic variables

Dependent Variable: OTTAWADTAX/OTTDSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.288	0.417	0.69	
@SEAS(4)	0.185	0.056	3.31	
@SEAS(6)	0.177	0.054	3.29	
@SEAS(7)	0.065	0.054	1.21	
DSPRING	0.312	0.043	7.32	
FXCAN(-5)	0.608	0.280	2.17	
PDL01	-0.028	0.005	-5.88	
R-squared	0.721	Mean dependent var		1.140
Adjusted R-squared	0.680	S.D. dependent var		0.180
Durbin-Watson stat	1.40			

Lag Distribution of DOTTAWA	i	Coefficient	Std. Error	T-Statistic
* .|	0	-0.0487	0.0083	-5.88
* .|	1	-0.0417	0.0071	-5.88
* .|	2	-0.0348	0.0059	-5.88
* .|	3	-0.0278	0.0047	-5.88
* .|	4	-0.0209	0.0036	-5.88
* .|	5	-0.0139	0.0024	-5.88
* .|	6	-0.0070	0.0012	-5.88
	Sum of Lags	-0.1947	0.0331	-5.88

4C. Sales, no economic variables

Dependent Variable: OTTAWADBARPUBSAL/OTTDSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	
C	14.774	0.453	32.64	
@SEAS(2)	-1.679	1.007	-1.67	
@SEAS(4)	1.301	1.007	1.29	
@SEAS(6)	1.496	1.007	1.49	
PDL01	-0.185	0.083	-2.24	
R-squared	0.224	Mean dependent var		14.165
Adjusted R-squared	0.152	S.D. dependent var		2.074
Durbin-Watson stat	2.39			

Lag Distribution of DOTTAWA	i	Coefficient	Std. Error	T-Statistic
* .|	0	-0.324	0.145	-2.24
* .|	1	-0.278	0.124	-2.24
* .|	2	-0.232	0.103	-2.24
* .|	3	-0.185	0.083	-2.24
* .|	4	-0.139	0.062	-2.24
* .|	5	-0.093	0.041	-2.24
* .|	6	-0.046	0.021	-2.24
	Sum of Lags	-1.297	0.578	-2.24

4D. Sales, economic variables

Dependent Variable: OTTAWADSAL/OTTDSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-9.355	10.394	-0.90	
@SEAS(4)	2.210	0.776	2.85	
@SEAS(6)	1.575	0.750	2.10	
DSPRING	3.606	0.597	6.04	
FXCAN(-5)	9.749	4.137	2.36	
OTTDSAL(-6)/1000	0.061	0.043	1.42	
PDL01	-0.381	0.128	-2.98	
R-squared	0.590	Mean dependent var		14.165
Adjusted R-squared	0.530	S.D. dependent var		2.074
Durbin-Watson stat	2.02			

Lag Distribution of DOTTAWA	i	Coefficient	Std. Error	T-Statistic
* .|	0	-0.667	0.224	-2.98
* .|	1	-0.572	0.192	-2.98

* .|	2	-0.477	0.160	-2.98
* .|	3	-0.381	0.128	-2.98
* .|	4	-0.286	0.096	-2.98
* .|	5	-0.191	0.064	-2.98
* .|	6	-0.095	0.032	-2.98
	Sum of Lags	-2.670	0.896	-2.98

Equations for London

5A. Tax Receipts, no economic variables

Dependent Variable: LONDONTAX/LONDSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic
C	0.874	0.009	92.14
@SEAS(1)	-0.137	0.024	-5.76
@SEAS(2)	-0.127	0.024	-5.36
@SEAS(4)	-0.067	0.024	-2.81
@SEAS(5)	-0.074	0.024	-3.13
@SEAS(9)	0.057	0.024	2.41
@SEAS(10)	-0.042	0.024	-1.80
DLONDON	-0.102	0.020	-5.16

R-squared	0.679	Mean dependent var	0.828
Adjusted R-squared	0.623	S.D. dependent var	0.071
Durbin-Watson stat	1.30		

5B. Tax receipts, economic variables

Dependent Variable: LONDONTAX/LONDSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic
C	1.241	0.104	11.88
@SEAS(1)	-0.130	0.021	-6.20
@SEAS(2)	-0.122	0.021	-5.79
@SEAS(4)	-0.062	0.021	-2.95
@SEAS(5)	-0.070	0.021	-3.34
@SEAS(9)	0.054	0.021	2.59
@SEAS(10)	-0.045	0.021	-2.18
DLONDON	-0.083	0.018	-4.53
@MOVAV(UN(-6),6)	-0.057	0.016	-3.53

R-squared	0.757	Mean dependent var	0.828
Adjusted R-squared	0.707	S.D. dependent var	0.071
Durbin-Watson stat	1.76		

5C. Sales, no economic variables

Dependent Variable: LONDONSAL/LONDSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.207	0.155	65.98	
@SEAS(1)	-1.927	0.406	-4.74	
@SEAS(2)	-1.768	0.406	-4.35	
@SEAS(4)	-1.148	0.406	-2.83	
@SEAS(5)	-1.253	0.406	-3.08	
@SEAS(10)	-0.701	0.407	-1.72	
DLONDON	-1.009	0.407	-2.48	
D(DLONDON(-4),0,2)	-0.538	0.659	-0.82	
R-squared	0.541	Mean dependent var		9.492
Adjusted R-squared	0.461	S.D. dependent var		1.023
Durbin-Watson stat	1.87			

5D. Sales, economic variables

Dependent Variable: LONDONSAL/LONDSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	13.678	1.959	6.98	
@SEAS(1)	-1.729	0.395	-4.38	
@SEAS(2)	-1.744	0.406	-4.30	
@SEAS(4)	-0.952	0.394	-2.42	
@SEAS(5)	-1.220	0.402	-3.03	
@SEAS(9)	0.381	0.397	0.96	
@SEAS(10)	-0.589	0.396	-1.49	
@SEAS(11)	0.582	0.407	1.43	
@MOVAV(UN(-6),6)	-0.556	0.300	-1.85	
@PCH(CANXIP(-1),2)	15.874	9.584	1.66	
DLONDON	-0.809	0.408	-1.98	
D(DLONDON(-4),0,2)	-0.972	0.679	-1.43	
R-squared	0.629	Mean dependent var		9.492
Adjusted R-squared	0.515	S.D. dependent var		1.023
Durbin-Watson stat	1.98			

Equations for Kingston

6A. Tax Receipts, no economic variables

Dependent Variable: KINGSTONTAX/KINGSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.395	0.018	77.10	
@SEAS(1)	-0.169	0.039	-4.38	
@SEAS(2)	-0.177	0.039	-4.58	

@SEAS(3)	0.091	0.039	2.37
@SEAS(6)	0.070	0.039	1.82
@SEAS(7)	0.243	0.039	6.28
@SEAS(8)	0.338	0.039	8.75
@SEAS(9)	0.333	0.043	7.67
@SEAS(10)	0.115	0.038	3.01
@MOVAV(DKINGSTON(-4),4)	-0.050	0.055	-0.99
D(DKINGSTON(-4))	-0.1352	0.080	-1.69

R-squared	0.875	Mean dependent var	1.460
Adjusted R-squared	0.841	S.D. dependent var	0.171
Durbin-Watson stat	1.38		

6B. Tax Receipts, economic variables

Dependent Variable: KINGSTONTAX/KINGSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.607	0.166	9.66	
@SEAS(1)	-0.176	0.036	-4.92	
@SEAS(2)	-0.179	0.036	-5.01	
@SEAS(3)	0.083	0.036	2.32	
@SEAS(6)	0.068	0.036	1.89	
@SEAS(7)	0.252	0.036	7.03	
@SEAS(8)	0.346	0.036	9.65	
@SEAS(9)	0.338	0.040	8.42	
@SEAS(10)	0.132	0.036	3.67	
@PCH(CANXIP,6)	0.991	0.482	2.05	
UN	-0.033	0.025	-1.33	
@MOVAV(DKINGSTON(-4),4)	-0.072	0.053	-1.37	
D(DKINGSTON(-4))	-0.107	0.075	-1.43	

R-squared	0.899	Mean dependent var	460
Adjusted R-squared	0.864	S.D. dependent var	0.171
Durbin-Watson stat	1.82		

6C. Sales, no economic variables

Dependent Variable: KINGSTONSAL/KINGSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	17.700	0.287	61.63	
@SEAS(1)	-3.064	0.721	-4.25	
@SEAS(2)	-2.839	0.721	-3.94	
@SEAS(4)	-0.997	0.721	-1.38	
@SEAS(7)	2.117	0.721	2.94	

@SEAS(8)	3.789	0.721	5.25
@SEAS(9)	2.918	0.816	3.58
@MOVAV(DKINGSTON(-4),4)	-1.040	1.045	-0.99
D(DKINGSTON(-4))	-1.229	1.549	-0.79

R-squared	0.723	Mean dependent var	17.780
Adjusted R-squared	0.667	S.D. dependent var	2.291
Durbin-Watson stat	1.98		

6D. Sales, economic variables

Dependent Variable: KINGSTONSAL/KINGSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.992	4.009	2.99	
@SEAS(1)	-3.445	0.711	-4.84	
@SEAS(2)	-3.213	0.709	-4.53	
@SEAS(4)	-1.112	0.707	-1.57	
@SEAS(7)	2.321	0.686	3.38	
@SEAS(8)	3.762	0.681	5.52	
@SEAS(9)	3.069	0.770	3.99	
@MOVAV(KINGSAL(-1),6)/1000	0.045	0.032	1.41	
D(UN)	-3.923	2.810	-1.40	
@MOVAV(DKINGSTON(-4),4)	-2.486	1.318	-1.89	
D(DKINGSTON(-4))	-1.826	1.575	-1.16	
@PCH(CANXIP,2)	22.782	20.885	1.09	
@PCH(CANXIP(-6),6)	18.258	9.464	1.93	

R-squared	0.784	Mean dependent var	17.780
Adjusted R-squared	0.710	S.D. dependent var	2.291
Durbin-Watson stat	2.45		

Equations for Kitchener

7A. Tax Receipts, no economic variables

Dependent Variable: KITCHENERTAX/KITCHSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.462	0.014	34.11	
@SEAS(1)	-0.092	0.019	-4.72	
@SEAS(2)	-0.111	0.019	-5.69	
@SEAS(3)	-0.052	0.019	-2.70	
@SEAS(4)	-0.057	0.019	-2.92	

@SEAS(5)	-0.082	0.019	-4.21
@SEAS(6)	-0.076	0.019	-3.89
@SEAS(7)	-0.116	0.019	-6.05
@SEAS(8)	-0.098	0.019	-5.14
@SEAS(9)	-0.056	0.019	-2.92
@SEAS(10)	-0.053	0.019	-2.79
@SEAS(11)	-0.032	0.019	-1.69
D(DKIT,0,6)	-0.028	0.013	-2.22

R-squared	0.690	Mean dependent var	0.390
Adjusted R-squared	0.584	S.D. dependent var	0.042
Durbin-Watson stat	1.33		

7B. Tax Receipts, economic variables

Dependent Variable: KITCHENERTAX/KITCHSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.459	0.012	37.35	
@SEAS(1)	-0.097	0.018	-5.47	
@SEAS(2)	-0.113	0.018	-6.43	
@SEAS(3)	-0.057	0.018	-3.20	
@SEAS(4)	-0.058	0.018	-3.31	
@SEAS(5)	-0.080	0.018	-4.57	
@SEAS(6)	-0.070	0.018	-3.99	
@SEAS(7)	-0.107	0.018	-6.10	
@SEAS(8)	-0.095	0.017	-5.46	
@SEAS(9)	-0.054	0.017	-3.11	
@SEAS(10)	-0.054	0.017	-3.11	
@SEAS(11)	-0.031	0.017	-1.80	
@PCH(CANXIP,3)*100	0.0082	0.003	2.95	
D(DKIT,0,6)	-0.037	0.012	-3.10	

R-squared	0.753	Mean dependent var	0.390
Adjusted R-squared	0.659	S.D. dependent var	0.042
Durbin-Watson stat	1.63		

7C. Sales, no economic variables

Dependent Variable: KITCHENERSAL/KITCHSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.941	0.155	31.93	
@SEAS(3)	1.385	0.461	3.00	
@SEAS(7)	-0.880	0.462	-1.90	
@SEAS(8)	-0.655	0.462	-1.42	
D(DKIT,0,6)	-0.752	0.387	-1.94	

R-squared	0.289	Mean dependent var	4.835
Adjusted R-squared	0.223	S.D. dependent var	0.988
Durbin-Watson stat	1.62		

7D. Sales, economic variables

Dependent Variable: KITCHENERSAL/KITCHSAL
Method: Least Squares
Sample: 2000:01 2003:12
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.918	0.151	32.64	
@SEAS(1)	-0.633	0.432	-1.47	
@SEAS(3)	1.179	0.431	2.74	
@SEAS(7)	-0.670	0.437	-1.53	
@SEAS(8)	-0.605	0.429	-1.41	
D(DKIT,0,6)	-0.987	0.371	-2.66	
@PCH(CANXIP,3)*10 0	0.261	0.090	2.91	

R-squared	0.424	Mean dependent var	4.835
Adjusted R-squared	0.340	S.D. dependent var	0.988
Durbin-Watson stat	1.83		